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THE PRESIDENTIAL ADDRESS

THE RIGHT HONOURABLE LORD NATHAN

IN THIS, MY ANNUAL REVIEW of events and developments during the past year, I keep to the same general plan as previously. First, therefore, I take our meetings. Of those between October and December I think that the two evening meetings on the Sherpas of Eastern Nepal by Professor von Fürer-Haimendorf, and on the Belgian Antarctic Expedition by Baron de Gerlache de Gomery, were of exceptional interest. Early in the New Year we had a somewhat unusual topic discussed: the Channel Tunnel. If a Channel Tunnel or a Channel Bridge comes into being, the effects on this country in terms of both political and economic geography might well be considerable, and we were very grateful to Mr. H. J. B. Harding, a Vice-President of the Institution of Civil Engineers, for his exceedingly interesting discourse. Generally speaking, the Himalaya and the Polar regions have lost some of the prominence in our lecture programmes which they have had in recent years; and of the countries which have come to the fore, those of South America have been specially noticeable. We had a very stimulating paper, for example, from Sir Charles Darwin on the life of his grandfather, so much of whose work sprang from this region, and another, on current exploration, from Dr. Martin Holdgate, the leader of the Royal Society's expedition to Southern Chile. I am happy to say that the younger—perhaps I might even say the youngest—travellers were also represented in our evening lecture programme; by the leader of the Imperial College (London) expedition to the Bolivian-Peruvian Border, and by those of two Oxford University expeditions: one to Tanganyika, the other to British Guiana. Another lecture on South America was delivered by Mr. Peter Haggett at an afternoon meeting. This was notable because Mr. Haggett, of Cambridge, was the first recipient of a grant from the Society's newly established Latin-American Travel Fund for geographical research. I cannot end these remarks on our meetings without referring to the Dickson Asia Lecture for 1960. This, concerned with the archaeology and ancient geography of Pakistan, was delivered in characteristically brilliant fashion by Sir Mortimer Wheeler, director of the excavations and Secretary of the British Academy. Then at Christmas we had our usual children's lectures (which adults can only attend if properly accompanied). These, by David Attenborough and A. C. Barrington-Brown, were both repeated, and were, as usual, full to capacity; they were first-rate.

Our exhibitions this year opened in October last with an exhibition on the mapping of Switzerland which was the Society's contribution to "Swiss Fortnight" in Britain. This exhibition, of maps and survey equipment provided by a large number of firms and Government organizations in Switzerland, was opened by the Swiss Ambassador and visited by 1700 people. Then at Christmas time we had our

customary exhibition for children, this year organized by the Ordnance Survey. This not only illustrated the development of the mapping of this country over the last two centuries, but illustrated also in a very vivid and instructive way the processes of modern cartography which the Ordnance Survey has brought to such a very fine science and art. This Ordnance Survey exhibition was of course of particular interest to schools, and included in the total number of visitors to it (4500) were 2500 school children. In the spring we held a small exhibition revolving round Miss Alice Coleman's project for a new land use survey of England and Wales. This was in connection with her lecture on that subject at one of our afternoon research meetings.

The work of your Council and of all its various Committees has been as energetic as usual. Of the Finance Committee which is, as you know, also the House Committee, I will not speak because you will be hearing about this from our Honorary Treasurer, Mr. Leonard Brooks. I would, however, like to mention two developments of great importance. The first has been the repayment of tax on Covenants made over the last seven years. This, after a very long delay, has come as a most welcome reinforcement to our funds. The second development, which we all very greatly welcome, and which is indeed vital to the future prosperity of the Society, is the number of Fellows who have agreed either to continue Covenanting, or to start new Covenants. I can hardly impress upon the Fellows of the Society too strongly the immense assistance that they can give to the Society in this way. At the present rate of tax, for every £4 subscription under Covenant, we receive £6 7*s* 10*d*. Another matter for great satisfaction has been the receipt of the first part of a very generous bequest—which will ultimately amount to about £18,000—from the late Mrs. Ursula Lloyd, who was a Fellow of the Society from 1936 to 1956. Bequests with special restrictions attached can often be a considerable embarrassment to a Society like ourselves where needs are so often changing. I am therefore happy to say that the Mrs. Ursula Lloyd bequest was couched in the most general terms and its distribution is left entirely to the Council to decide. One further and very recent legacy must be mentioned, and that is from the late Lady Dorothy Mills, also a Fellow of the Society for many years. This, for £1000, is to be spent within ten years and is to be devoted to the support of some explorative enterprise carried out by a Fellow of the R.G.S. with the qualification of being a young woman. Detailed conditions are now being worked out and we expect a galaxy of applications in due course.

Before I refer to the activities of the other working Committees of the Council I must mention one new Committee, the Committee for Medical Geography, the establishment of which was foreshadowed in my last Presidential Address. This has already discussed a number of projects in this new and exciting field which deserve encouragement and, as you know, the Committee—of which I am Chairman—consists not only of geographers, including two of our Vice-Presidents, Professor Dudley Stamp and Professor J. A. Steers, but also distinguished medical men, as those of you who read the *Geographical Journal* will have seen.

Of the old-established working Committees, the Library and Maps Committee under Professor L. Dudley Stamp has been exceptionally active. More books, thanks to various special funds, have been purchased than in any previous year. The recataloguing of the older books has advanced considerably with the continued help of a grant from the Pilgrim Trust. Finally, special efforts are being made to rebind and repair a great number of volumes which for some years have urgently needed attention but for which funds were not available. On the Map Room side, the Committee has been no less active. Map accessions this year amounted to some

15,000 sheets of maps and charts. A new system of storing the many heavy atlases in the Society's collections has been devised; none too soon, since our collection of atlases is already pressing very heavily on our available space.

A relatively new responsibility of the Library and Maps Committee has been that for the Society's archives. The indexing and cataloguing of these, mostly in the form of correspondence and memoranda from the Secretary's files, has made good progress. The value of these archives, which had been somewhat neglected in former years, is now becoming widely known. This has added to the cares of our archivist, Mrs. Langdon, and of our Library and Map Room staff under Mr. G. R. Crone, since requests for microfilms of manuscripts, as well as visits from British and foreign research workers, are daily increasing.

Many of us had wondered what had happened to the papers of the African Association which was absorbed by our Society in our earliest days. It seemed possible that these might be amongst the voluminous correspondence of the great naturalist Sir Joseph Banks, the virtual founder of the Association in 1788. The first enquiries revealed that the section of his correspondence relating to African affairs is now conserved in the Sutro Library in San Francisco. Microfilmed copies of this African material, kindly provided for us by the Sutro Library, showed that this, while of great interest for the history of African exploration, did not include the "official" papers of the Association. We were then informed by the British Museum (Natural History) that a scheme for the publication of a calendar of the complete correspondence of Sir Joseph Banks was in hand, and we now hope that this African section can be included in this uniform scheme.

Meanwhile, the Minute Books of the African Association and of its Dining Club have been located in the Cambridge University Library, and a microfilm of them has been kindly presented to us by the Syndics of the Library. It is hoped that it will now be possible to edit and publish these valuable records of this famous eighteenth century Association, with which we are historically linked.

Next comes our Research and Expeditions Committee under the chairmanship of Professor J. A. Steers. In my last Annual Address I referred at some length to this Committee and to new proposals for the investigation of the very large number of applications for financial and other support which we receive from expeditions every year. This year we received in all 61 applications, many of them concerned with zoology, botany and other research only indirectly or not at all geographical. All these (geographical or not) were considered in terms of expedition planning and technique as I promised that they should be last year. But only 33, roughly 50 per cent., were approved. This percentage shows, I think, the care with which the Committee scrutinizes these many applications. But it also shows, less happily, the number of projects for exploratory work which are ill-founded and hastily thought up. The great majority of the applications for support we receive come from the universities and I take this opportunity of saying that our Committee is greatly helped by the existence in some universities of Exploration Boards or Committees. These, composed of both undergraduates and senior members, perform a very valuable function. They undertake a preliminary sieving of undergraduate expeditions and in our experience this process is usually pretty successful. No doubt organizations of this kind are suitable only to certain universities. But if they could be more widespread I feel quite sure that such preliminary investigations, carried out as they are by those in close personal contact with the leaders of these expeditions, would greatly simplify the work of our own Research and Expeditions Committee. Of the total of 33 expeditions supported by the Society 17 were also given grants by the Mount Everest Foundation, of which the Society is a partner with the Alpine Club

and of which I have been this year's Chairman. The M.E.F. also gave grants to a further five expeditions for mountain research and exploration; making a total of 38 expeditions in all receiving some form of support. For financial reasons we have always been compelled to limit our support of expeditions to those of not less than undergraduate status. In my Address last year I spoke of the possibility of being able to extend encouragement also to expeditions of young people from the schools of this country and from industry. For the time being this is out of the question, but I still have not given up this idea as a possibility for the future.

It is to some extent because of the heavy burden of expedition work on the present Research and Expeditions Committee that your Council has decided to revert to a former situation when, for a time, there were two Committees: one for Expeditions and one for Research. This I think will have a number of advantages. A separate Expeditions Committee will have more opportunity to discuss some of the technical problems concerning exploration, such as clothing, equipment, transportation, physiological problems, health, diet and rations. Then, too, there will be advantages on the research side. A separate committee here will enable us considerably to broaden the range of representatives from university departments. I do not suggest that the new Research Committee should itself undertake research, still less that it should attempt to direct research elsewhere! But I feel sure, if its representatives are widely drawn from our national universities, that it should prove a most useful forum for the discussion of current research problems. Its authority, and the authority of the Society as a whole, may well be very valuable in advancing geographical projects of particular importance, and especially those of broad national concern.

Before I leave research developments, I must mention one very important event in this field in the course of the last year. That is the creation of a Royal Geographical Society Research Fellowship. This has been made possible by a generous donation from the Marc Fitch Fund, and the subject of the Fellowship, which has been awarded to Dr. Peter Salway, Research Fellow of Sidney Sussex College, Cambridge, will be the geography and topography of the Roman Fenland. Denudation and development are now threatening this historic part of Britain and it is important that all information available from surface sites, excavation and air photographs should be collated together and should be published, with a memoir, in map form. This will be Dr. Salway's principal task. But this piece of research is really only a first step in a larger and longer programme. Our original intention had been to foster research in the coastal morphology of Roman Britain. In future years, if funds can be found, I hope that this work in the Fenland can be extended eastwards towards the coastal areas.

I now turn for a moment to the position as regards publications, a subject which comes, as you know, under the Publications Committee of which the Chairman is our senior Honorary Secretary, Dr. Edward Hindle, F.R.S. Here we have made good progress. No. 3 in our Research Series, 'The making of the Broads' by Dr. J. M. Lambert and others, was published in February of this year. It has been widely reviewed and is the first of our Research Memoirs to have featured in a television programme! No. 4 of the same series, 'Norwegian cirque glaciers' edited by W. Vaughan Lewis of Cambridge, is published today. Meanwhile, further publications are being planned. One of these, which I hope will appear this year, will be in the Society's very popular series 'Reproductions of early maps.' This will be a portfolio of manuscript and printed maps illustrating the development of the map of Great Britain from the thirteenth to the sixteenth centuries. This publication, I feel sure, will not only be, with its separate sheets, of special value to schools, but

will also make a most attractive gift which we hope to make available at a relatively low price. Finally, I must mention that we are reprinting the small booklet 'Modern geographers,' written by our Librarian and Map Curator, Mr. Crone. The first edition of this valuable and in many ways unique little book is now exhausted and there have been many demands for further copies. In connection with publications by members of our staff, I must also mention Mr. Kirwan's important history of Polar exploration. This, entitled 'The white road,' has had wide and appreciative notice, and I commend it to you. Lastly, the *Geographical Journal*; despite the loss of one issue due to the printing dispute, this has managed to keep pace with the large amount of material submitted and accepted for publication. Its outside circulation, I am glad to say, has increased.

I would like to say a word or two about our external relations. In September last, at the invitation of the Polish Academy of Sciences, I and Mr. Kirwan, our Director and Secretary, were invited to visit Poland and in particular to visit the Geographical Institute there which is under the direction of Professor Dr. Leszczycki, himself a man of great distinction in the public life of Poland as well as in the geographical field. In the course of a rapid tour in Poland of ten days we were able to see the remarkable strides forward which Polish geography had made since the War, despite great losses in material resources and among distinguished Polish scholars. Our visit luckily coincided with a British-Polish Geographical Seminar led by Professor K. C. Edwards of Nottingham University. Their meetings and our visit, I hope, will mark a period of even closer cooperation between Polish and British geographers than we have enjoyed in the past. I hope also in the near future that we shall be able to repay something of the warm welcome and generous hospitality which we received throughout our Polish visit and that these visits may be followed by others in the interest of close cooperation between the geographers and the geographical societies of East and West. During a recent visit to Italy I was myself able to make contacts with the geographers in Rome. And Mr. Kirwan on his return from archaeological work in the Sudan and Ethiopia was able to convey the greetings of this Society to the Royal Geographical Society of Greece. Such international contacts are, of course, the prelude to the great international gatherings of geographers which take place every four years. This is the year of the Nineteenth Geographical Congress, which is under the Presidency of our Honorary Member and Gold Medallist Professor Hans Ahlmann of Sweden. This year the Congress will take place in Scandinavia, or Norden as some prefer to say. I, together with Mr. Kirwan, shall be there to represent our Society. I look forward to the time when we in Britain will be the host country for one of these international assemblies of geographers from all parts of the world.

I now turn to certain broad matters concerning the Fellowship, Membership and the Council of the Society. As regards the first, I am happy to say that membership to date of all kinds numbers 7065. In giving you this total, which is ahead of any figure achieved in the past, I would like to refer specially to the encouraging increase in the numbers of our Corporate Members. Their association with our Society is particularly welcome and valuable and I hope that further candidates for Corporate Membership will be forthcoming from among the great industrial and commercial organizations of this country. With the exception of the small Government grant of £2000 for the Map Room, unchanged since 1949, we are wholly dependent upon the subscriptions of our Fellows and Members. I would therefore urge upon you all to continue to recruit candidates of the right kind. Only by advancing our membership can we keep pace with rising costs and have funds to spare to forward our great tasks of exploration and research.

As regards the Council, the main purposes of our proposals made at the Special General Meeting this afternoon have been to achieve not only a somewhat higher rate of change among the members of the Council, so that younger men and women may take part in the Society's government, but also to pay tribute to those who have rendered special service to the Society. It was for this last reason that your Council proposed the creation of a number of Honorary Vice-Presidents, and this you have approved. I can now therefore announce to you the names of those whom your Council had in anticipation chosen for this honour. The first of these is Lord Rennell, President of the Society from 1945 to 1948. As a Gold Medallist, a Saharan explorer of renown as well as a distinguished banker, he is very well known to you all. I think you will agree with me when I say that he more than anyone was responsible for re-establishing the Society on firm foundations after six years of war, and for setting it on the forward path of growth and prosperity which it has since been able to follow. The next name in the short list of Honorary Vice-Presidents, you will not be surprised to hear, is that of Sir James Wordie. He was President from 1951 to 1954 and his Presidency coincided with one of the great periods of British exploration which culminated in the ascent of Mount Everest by Sir John Hunt's expedition. In forwarding exploration in the Himalaya and in the Polar regions especially, Sir James Wordie's own long and distinguished experience as a Polar traveller and mountaineer was of the greatest value to us all. He was himself chief scientist on Shackleton's ill-fated Imperial Trans-Antarctic Expedition of 1914, and during his Presidency he set on foot the latest of many great British Polar enterprises, namely the victorious Commonwealth Trans-Antarctic Expedition led by our Special Gold Medallist, Sir Vivian Fuchs. Finally, I come to Mr. Leonard Brooks, a former Honorary Secretary and Vice-President of the Society and for the past seven years our devoted and energetic Honorary Treasurer. No one has dedicated more time or thought to the Society's financial, and indeed many other, problems. I am sure that we are all delighted that now, on his retirement from the office of Honorary Treasurer, he will be able to continue his long association with the Council in his new capacity as Honorary Vice-President.

Finally, I must refer briefly to the losses which our Fellowship has suffered in the last twelve months. First and foremost I must mention Lord Catto of Cairncatto, who was our Honorary Treasurer from 1946 to 1953, at the time when Lord Rennell as President was re-establishing and extending the Society's position after the War. The advice and assistance of a banker of such repute, and Governor of the Bank of England, was of the utmost value at that crucial time. Another of our Fellows who died during the year was Sir Leonard Woolley, one of the great archaeologists of the twentieth century, and a true exponent in all his work of the geographical point of view.

In the field of education, the death of our Fellow George Joseph Cons in January deprived geography in this country of one who had contributed much to geographical education and in particular to visual methods of teaching geography. The death of Professor Jarvis was another loss, of one who had built up a flourishing department of geography in the University of Bristol.

Other notable names have been those of Mr. J. E. Tracy Philipps, a Fellow of the Society since 1917 and Secretary-General of the International Union for the Conservation of Nature and Natural Resources. A link with a famous explorer of the past was broken on the death of Major Denzil Morton Stanley, the adopted son of Sir Henry Morton Stanley of African fame.

The Society lost one of its most distinguished Fellows on the death of Countess Mountbatten of Burma. Lady Mountbatten found time among her innumerable

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His Royal Highness the Duke of Edinburgh welcomed by the Mayor of Westminster at the opening of the International Youth Science Fortnight at the Society, 18 July 1960

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The President, Lord Nathan, presents the Patron's Medal to Professor Théodore Monod, 12 June 1969

activities to value her connection with the Society and was present with her husband at the Anniversary Dinner in 1955. Another sad loss was that of Air Chief Marshal Sir Frederick Bowhill, a Fellow for over 30 years, who took a keen interest in the affairs of the Institute of Navigation which is established in our House.

This is no silent, solemn, somnolent Society. It has, as my brief record here today suffices to show, a vivid and vigorous life pulsating with activity. It is conscious of opportunities to advance geographical knowledge and experience through exploration, exhibitions, mapping, publication and documentation and in many other ways. It is always ready to seize these opportunities, with a mind attuned not only to the past or present, but open-eyed to the future within our chosen field.

We show results. But these results are unattainable without the devoted and concerted cooperation and sheer hard work of a skilled staff of most modest size. To all of them I gladly extend on your behalf warm thanks and deep appreciation—and I must express too, and I do most gladly, our sense of obligation to Mr. Kirwan, our unresting Director and Secretary, under whose responsibility our work is conducted and who yet finds time to extend the name and fame of our Society in many areas of the world through his work and travels as geographer, archaeologist and historian; to Mr. Crone, who has established a reputation not only for himself but also for our Library and our Map Collection, where lies his chief responsibility, and whom we are glad to have back recovered and fitter than ever after a longish period of illness; to Mr. Dugdale, his able assistant; to Mr. Day, who is responsible for the skilled work of our Map Room and our film and photographic activities, and Mr. Backhouse, who keeps an ever watchful eye on our financial incomings and outgoings; and to Mr. Holland and his highly skilled staff in our Drawing Office, and to all those others on our staff. Among them I must especially mention Mrs. Middleton, who so admirably assists in the editing of our publications; and Miss Muir, our Director's Personal Assistant, whose ever ready help is so widely recognized. All with modesty but keenness give that energetic and loyal support in the daily work of our Society which, without such help, would be something vain and empty. To all of these I say, for you, thank you.

The President, Lord Nathan, presents the Patron's Medal to Professor Théodore Monod, 22 June 1960
Keystone Press

DEFOE AND THE SOURCES OF HIS 'TOUR'

J. H. ANDREWS

DANIEL DEFOE'S 'Tour through the whole island of Great Britain (1724–6)'[1] occupies a curiously equivocal position among the source materials of historical geography. No book of its time has been more widely quoted, or more widely praised, as an original authority on matters of social and economic geography; yet time and again its author has been charged with plagiarism, inaccuracy and deliberate deception. Defoe himself expected criticism and defended himself in advance; indeed he was inclined to protest too much, and did not improve matters by constantly shifting the ground on which his defence was based. Thus he was anxious to minimize his debt to other authors ("I copy nothing from books, but where I quote the books, and refer to them" (II, 149)*), but this disclaimer is weakened by being confined to published work: the 'Tour' was admittedly "corrected and enlarged" with the help of a friend's manuscript (II, 136). Defoe also claims to be writing mainly from personal experience of the country. Part of his Scottish material is acknowledged to be second-hand, but in his account of England and Wales, with which the present paper is chiefly concerned, there is no such admission; on the contrary he contrives, without ever making the claim explicit, to suggest that he has visited every place described in the book. This effect is skilfully achieved by several devices: frequent references to coaches, horses, inns and other details of the road; unsparing criticism of other writers who "pretend to speak positively of the places which they ought not to have done if they had not been there" (II, 182); and confessions, disarmingly candid, that a few, unimportant, localities had been omitted from the book because he had been unable to see them for himself. Finally, the 'Tour' claims to be up to date; its first chapter tells how the author set out from London in April 1722, and the preface to the last volume looks back on "a tedious and very expensive five years journey."[2] In the intervening pages, though very few of his observations are dated, Defoe frequently stresses that the book is tracing the routes he had followed only a short time before. This claim is somewhat weakened, however, by his evident dependence on much earlier journeys for a substantial part of his material, five of the seven dated visits in the 'Tour' having taken place before 1700; it is even more seriously weakened by a revealing slip in the first volume, where he gives a list of recent excursions (I, 3) some of which, according to later volumes, had not then taken place.

These slightly ambiguous claims have encountered a mixed reception. Many local historians and some historical geographers[3] have accepted that Defoe described what he saw on his travels in the 1720's, but few serious critics or biographers have been wholly convinced, and most of them have considered that, while the 'Tour' provides an admirable general impression of the English scene, some of its detail is either second-hand, out of date, or unreliable. But these opinions seem to be based not so much on any close study of the 'Tour' as on certain general preconceptions about Defoe's literary methods; at any rate no critical study of the 'Tour' has appeared in print.[4] For the historical geographer concerned with individual regions this kind of overall judgment is not enough; if the book is open to criticism, one must show exactly how and where. In the following paragraphs an

* Volume and page numbers in brackets refer to G. D. H. Cole's Everyman's Library edition of the 'Tour.'

attempt is made to do this, firstly by establishing the depth and range of Defoe's personal knowledge of England and Wales, and then by investigating his use of literary and documentary sources.

Defoe's travels

The evidence relating to Defoe's English journeys[5] falls into three categories. Before 1704, it is mainly autobiographical in character, and meagre and fragmentary in quantity, though probably as reliable as its author's memory allowed: in his earlier writings he had no motive for inventing journeys, and even in the 'Tour,' with its emphasis on up-to-dateness, little could be gained by inventing journeys that were twenty years old. A second period, from 1704 to 1712, is well supplied with documentary evidence, notably Defoe's letters to Robert Harley; but for the period 1713–26 we are almost entirely dependent on the doubtful claims of the 'Tour' itself.

Defoe was born in London in 1660 and, except for a childhood visit to Ipswich (I, 40), presumably spent his early years there.[6] For several years after 1672 he attended a Dissenters' boarding school in Dorking and his lively account of the Mole Valley (I, 147–54) seems to be wholly derived from this early period.[7] London was the scene of his early business operations as hose-factor and general merchant, though the 'Tour' records a first trip to Liverpool in 1680 (II, 255) and a visit to the races at Quainton near Aylesbury at some time during the heyday of the Duke of Monmouth (II, 14). In later years Defoe boasted of having been "in arms" under the duke[8]; whatever his military exploits, he certainly wrote with some knowledge of the battle of Sedgemoor (I, 269) and several biographers think that he may have been in Somerset, perhaps visiting the relatives he mentions at Martock (I, 219), at the outbreak of the Monmouth rebellion. Three years later, he rode via Windsor, Maidenhead and Reading to Henley to meet the army of William of Orange on its way from Torbay to London (I, 298). His activities in the intervening years are uncertain. For some biographers,[9] the period 1684–8 was a time of intensive "sociological" travelling in which most of the material for the 'Tour' was collected. But the only evidence for this theory comes from a much later book, in a passage narrated by a fictitious visitor to England whom there is no special reason for identifying with the author[10]; in 1684 Defoe was still a young man, not long married, with no financial resources apart from his trading capital, and hardly able to afford a four years' study tour. And though he was doubtless establishing business contacts in many parts of England during this period, they left no direct traces in the 'Tour,' except perhaps for some references to having visited Ipswich about thirty-five years before the time of writing, (I, 42).[11]

In the following reign, while his commercial career continued its erratic course, Defoe seems to have taken service with William III. Unfortunately he never disclosed the exact nature of his duties; one can only observe that he seems especially well informed about places known to have been visited by the king on his journey to Ireland in 1690 (the 'Tour' records trips to Chester (II, 71) and Liverpool (II, 256) at this time) and on the royal progress through the Midlands in 1695.[12] Nor do we know for certain whether, as tradition asserts, Defoe lived for some time in Bristol after his bankruptcy in 1692.[13] But there is some fragmentary evidence of his movements during the next twelve years. He was seventy miles from London—he does not say where—at the time of his appointment as accountant to the commissioners for the glass duty in 1695.[14] He was at Steyning, Sussex, in 1697 (I, 131) and in his first important book, the 'Essay on projects,' published in the same year, he claims to have "narrowly observed all the considerable ways in that impassable county of

Sussex;"[15] the same observations probably inspired his sketch of Winchelsea a few years later as "the ruins and vaults, the remains of a good old town, now lying in heaps."[16] Another passage in the 'Essay' gives an obviously first-hand description of the Fosse Way from near Marshfield to Cirencester and, if we can believe the 'Tour,' Defoe must have been at Tadcaster in 1698–9, when the bridge was rebuilt (II, 227) and at Chatsworth before 1702, when a hill he had seen was levelled by the Duke of Devonshire (II, 175); the last two observations perhaps date from the first of three journeys he says he had made through the West Riding (II, 188). His connection with the famous petition of 1701 involved at least one visit to Kent,[17] and about a month after the storm of November 1703 he returned to make a "circuit . . . over most parts of Kent," collecting information for his book 'The great storm.'[18] He was seen in Canterbury in June 1704.[19]

By this time Defoe had seen enough of England to write with confidence of its economic geography. He knew enough, for instance, to include Leeds and Manchester in his project for fifteen new provincial banking centres, "some of which, though they are not the capital towns of the counties, yet are more the centre of trade, which in England runs in veins, like mines of metal in the earth."[20] And in 'Giving alms no charity' (1704) he was already distinguishing himself from other contemporary economic writers by the scope and detail of his regional examples, drawn in this case from sixteen different English counties.

The story of Defoe's relationship with Robert Harley has often been told. Partly as a kind of public relations agent, partly as a one-man political intelligence service, he travelled the roads of England and Scotland, with frequent deviations in search of business opportunity or recreation. His first excursion of this kind, in the autumn of 1704, included Hertfordshire, Cambridgeshire, Bury St. Edmunds, the sea-coast towns of Suffolk, Norwich and possibly Kings Lynn.[21] The second, in 1705, covering twenty-seven counties in less than four months, was described in a series of letters to Harley, including an elaborate itinerary illustrated in Fig. 1 (facing p. 270). These show him spending three or four days in each of the principal towns *en route*, collecting information about the state of local opinion, local trade and industry, the political composition of the magistracy and corporations, and the goings-on at recent elections. Typical reports are "I have a perfect skeleton of this part of England and a settled correspondence in every town and corner of it" and "I have an exact scale of the people, their trade and magistracy." There is at least one independent witness to testify that these reports were not exaggerated[22]: Defoe was in fact conducting field research in political geography. This is the only one of his journeys that can be followed almost from day to day, and it is interesting to see how little it resembles any of the routes traced in the 'Tour.' For example, his ride across Blackstone Edge[23] at this time almost certainly inspired one of the set-pieces of the 'Tour' (II, 189–96), but it appears in the book as part of an excursion to the East Riding, which Defoe did not see in 1705 or perhaps ever, and its date is changed from late September to mid-August—an error of some meteorological significance in view of the 'Tour's' reference to snow on the hills.[24]

Much less is known of the northern journeys of 1706–12, which involved periods totalling more than two years of residence in Scotland as well as further political activity in northern England.[25] But Defoe's letters and newspaper articles, as far as they go (Fig. 2, facing p. 270), confirm the 'Tour's' claim to "having no less than five times travelled through the north of England, and almost every time by a different route" (II, 255); the northern route described in his novel 'Colonel Jack' may well have been based on one of these journeys. Besides these documented travels, there are unsupported traditions of further visits to Bristol[26] and Halifax[27] during

Defoe left London on 16 July and returned on 6 November 1705; the routes between towns are conjectural[45]

The numbers refer to Defoe's journeys from London to Edinburgh and back; dates in top right-hand corner[46]

National Portrait Gallery

Daniel Defoe (1660–1731)
Engraving by M. van der Gucht after J. Taverner, 1706

this period, but the only additional evidence in the 'Tour' points to one or more journeys through Hampshire at some time between 1702 and 1712 and perhaps connected with Defoe's scheme for settling Palatine refugees near Lyndhurst in the New Forest.[28]

In 1711, the *Review* summarized its editor's travels: "I have within these 20 years past, travelled, I think I may say, to every nook and corner of that part of the island, called England, either upon public affairs, when I had the honour to serve his late majesty King William . . . or upon my private affairs; I have been in every county, one excepted, and in every considerable town in every county with very few exceptions; I have not, I hope, been an idle spectator or a careless unobserving passenger in any place, and I believe I can give an account of my travels if need were."[29] This not very informative mixture of vagueness and precision is characteristic of Defoe's autobiographical statements; but enough evidence has been reviewed to show that his claims may well have been justified. There is no indication that he had been to Wales (apart from Wrexham), but in England the only important towns that he cannot be proved to have visited are York, Hull, Birmingham, Oxford, Southampton and Portsmouth, and the only counties he is not known to have seen are Cumberland, Westmorland, Rutland and Oxfordshire. And in view of the fragmentary nature of the evidence, these gaps in the record cannot be regarded as conclusive: Defoe almost certainly passed through York on his way to Scotland, and the 'Tour' shows what looks very much like first-hand knowledge of Southampton and Portsmouth and of the northern route through Westmorland and Cumberland. As for the sharpness of his observation, the pages of the *Review* (1704–13) provide something like a serial economic geography of England, in which his ideas on the location of industry, the distribution of population, the migration of labour and similar topics are illustrated with a wealth of freshly gathered detail.

In 1714 Defoe wrote an apparently first-hand description of the riot trials at Bristol,[30] but apart from his own statements in the 'Tour' there are few other indications that he travelled extensively after 1712. He was no longer young, his political intelligence work was over, and his correspondents seem to have supplied him with all the provincial items he needed for his newspapers.[31] In these circumstances his claim to five years' further travelling in 1722–6 needs careful investigation. We have seen that the 'Tour' is not generous with dates, but with the aid of local history many of its observations can be dated: thus happenings reported by Defoe can often be identified by reference to some external source; an interview with a named individual may provide a *terminus ad quem* for his visit if the date of the individual's death can be fixed; and a description of a building may give a *terminus a quo* if we know the date of its erection. To check the up-to-dateness of the 'Tour,' these methods have been applied to all those references to provincial England and to Wales—about a hundred in all—that seem in any way capable of being dated. More than two-thirds of them have yielded significant pieces of information, not least the fact that Defoe applies words like "new" and "lately" to events of up to fifty years earlier. It must be admitted that this process of independent verification gives no guarantee that Defoe had observed his local detail for himself; he is famous for his skill in passing off other people's experiences as his own, and one such imposture has already been detected in the 'Tour' by the editor of his correspondence.[32] Many of his incidents, especially those of an extraordinary or spectacular character, might well have been borrowed from acquaintances or from the press. But as it turns out, this difficulty hardly arises, for most of the datable incidents come from areas and periods for which there is, in any case, independent biographical evidence of a Defoe visit.

The results of this inquiry may now be briefly summarized. In the ten years before the publication of his first volume, Defoe lived on the outskirts of London, and the 'Tour' naturally reveals a detailed and recent knowledge of the city and of places within easy reach of it, like Greenwich, Blackheath and Dagenham. In addition, at least part of the first, East Anglian circuit was probably performed, as Defoe explicitly stated (I, 5, 62), in 1722–3.[33] His accounts of Ipswich and Colchester are detailed and up to date, including, for example, an Ipswich meeting house built in 1718 (I, 46). He appears to have seen the new sea mark (1720) at Walton on the Naze (I, 34); a reference to the death of Sir Robert Davers suggests that he was at Rushbrooke, Suffolk, in October 1722 (I, 77); he refers to the ruins of Audley End, which was demolished only in 1721 (I, 88); and although his memory played him false at Lynn,[34] he had obviously visited Norwich recently enough to check several statements made by John Macky in his 'Journey through England,' published in 1722.

But outside London and East Anglia, the English chapters of the 'Tour' yield only a handful of original passages indicating first-hand observations later than 1712, and none of these is wholly conclusive. Defoe may have been in Tunbridge Wells for the Prince of Wales's visit in September 1716 (I, 126), but he may have been elaborating, at second hand, a report that had appeared in one of his own newspapers.[35] The same is true of the recent flood damage recorded at Chester (II, 70), which had also been reported in one of Defoe's papers in 1720.[36] In 1716 Gunwade ferry between Northamptonshire and Huntingdonshire had been replaced by a bridge over the river Nene; Defoe writes of crossing this bridge in a coach (II, 109) but if, as he says, it was remarkable for its exorbitant toll he may have been writing from hearsay, especially as the bridge lay on the main road from London to York. Another doubtful case is the 'Tour's' reference to visiting Coleshill, Warwickshire, shortly after the proclamation against Thomas Carte in 1722 (II, 82); Defoe's account of this affair is so vague and inaccurate that it seems unlikely to have been based on information collected on the spot.[37] It is doubtful whether the last three examples indicate a recent excursion through the Midlands; the Midland descriptions in the 'Tour' are certainly full of detail, particularly in the district between Leicester and Peterborough, but they lack some of the freshness of the East Anglian circuit.

With these exceptions, almost all the 'Tour's' original observations could have been made by a traveller of Queen Anne's reign or earlier. To select a few examples: the Faversham powder mills had blown up (I, 112) in September 1703; the storm at Plymouth (I, 228), the sea-fight off the Lizard (I, 245), the turbulent Coventry election (II, 83) and the discommoning of the Cambridge tradesman (I, 86) had all taken place in 1705; the Taunton schoolmaster interviewed by Defoe died in 1706 (I, 267); the last Doncaster mayor to have been described as an inn-keeper (II, 181) had held office in 1707; and the explosion in the Durham mines (II, 249) had occurred in 1710. The most recent building in northern England of which the 'Tour' shows first-hand knowledge was Bramham (II, 209), completed in 1710; in the south-west it was the "new-built" meeting house at Liskeard (I, 233), erected in 1701. Similarly, the long and valuable appendix to the second volume, dealing with road improvements, shows no first-hand acquaintance with recent road works outside the London area and the eastern counties, and in writing of North Kent Defoe openly depends on second-hand information about the turnpikes (II, 127). The 'Tour's' errors and omissions are also significant. Thus Nieuport is given as the Flemish terminus for the Dover packet boats (I, 122), though it had been superseded by Ostend as long ago as 1707. Worcester is said to be in need of a new town

hall (II, 44) but in fact it already had one, completed in 1723. And Defoe takes two paragraphs to describe All Saints' Church in Derby (II, 157) without saying that it was being rebuilt at the time of his alleged visit. Again, knowing his keen interest in trade and industry, one might have expected him to note the new cloth hall at Leeds (1711), the new steam engine at Whitehaven (1718), the Mersey and Irwell navigation works begun in 1721 and the new custom house at Liverpool (1722), if he had travelled recently enough to see them.

Reviewing the evidence as a whole, one can hardly escape the conclusion that, apart from the London area and East Anglia, Defoe's travels were almost complete more than a decade before the appearance of the 'Tour'; any later journeys would surely have figured more prominently in a book that set so much store by being up to date. In fact the 'Tour' seems to have been inspired not so much by recent experience as by the publication of John Macky's 'Journey' in 1722, and Defoe seems to have invented his five years' tour to justify the appearance of a rival travel book that was actually based on material older than Macky's.

Literary and documentary sources

If the foregoing account of its origin is correct, very little of the 'Tour' was based on planned topographical field-work: Defoe must have depended on his capacious but not always accurate memory, supplemented by such notes as survived from his period of service under Harley, and by information drawn from published books and maps. Nothing is known of his manuscript materials, apart from a hint that he had not kept many notes (II, 136), but the 'Tour's' debt to printed sources can be traced without much difficulty. Defoe cannot be accused of using maps or roadbooks to invent plausible "circuits." He makes several passing references to maps, apparently to Robert Morden's county sheets of 1695, but his routes—and his spellings of place-names—seem to be entirely his own. Only in South Wales, between the Black Mountain and "Monuchdenny hill" (II, 54) can he perhaps be suspected of reading a "journey" off Morden's maps. But, in spite of the range and depth of his own experience, he had two motives for borrowing from earlier writers. In the first place he needed to broaden the scope of his subject matter. His own interests were extraordinarily wide, and he shows much ingenuity in weaving them into the fabric of the 'Tour:' horse-racing, medicinal spas, the Civil War, the biography of William III, the great storm, roads and roadmaking past and present, problems of local government and parliamentary representation, and of course economic geography—all his favourite subjects found a place, with the wise exception of party politics. But these interests had to be alternated with enough orthodox topographical matter to bring the book at least partly into line with the Camden-inspired regional descriptions of the time, and orthodox topography was one of the few kinds of literature in which Defoe lacked experience. Most of the 'Tour's' toponymy, archaeology, Roman and medieval history were in fact derived from Edmund Gibson's 1695 edition of Camden's 'Britannia,' often with open acknowledgement, and most of its Church history came from William Dugdale's 'Monasticon Anglicanum.' Several other historians and antiquaries are mentioned, but this was more to give the 'Tour' an air of erudition than because Defoe had made much use of their work.

Architecture and art were other subjects of conventional topography of which Defoe has much to say without being able to draw on any expert knowledge of his own. Much of his material relating to country houses, cathedrals, gardens and picture galleries is taken without acknowledgement from Macky's 'Journey.' Defoe never mentions Macky except to depreciate his work (I, 42, 51), but the resemblances

between the two books are often unmistakable, for instance at Petworth, Cannons, Wilton, Salisbury, Worcester and several places in Scotland. Another deceptive feature of the 'Tour' is its habit of achieving an effect of intimate personal knowledge by noting minor details of ecclesiastical buildings—without saying that these descriptions are based on the excellent engravings in the 1717 edition of Dugdale's 'Monasticon.' With the help of such works as 'Britannia illustrata' (1713), Campbell's 'Vitruvius Britannicus' (1717–25) and the 'Nouveau théatre de la Grande Bretagne' (1724), Defoe could have extended the same method to country houses, but there is no positive evidence that he did so.

A second kind of borrowing, which Defoe never acknowledged, was needed not so much to obtain specialized topographical information as to include places, or periods, outside the range of the author's own experience. John Senex's 'New general atlas' (1721), for example, is mentioned only in a couple of passing references, both derogatory (I, 55, 151); but in fact it provided the 'Tour' with a good deal of miscellaneous guidebook information about places that Defoe had probably never visited, notably Wales, West Cornwall and the East Riding, including Hull, as well as contributing to his accounts of several towns in Derbyshire, Dorset and Somerset. And in borrowing similar items from Macky, it is noticeable that Defoe made a point of selecting those of his rival's observations that were more up to date than his own travels.[38]

The 'Tour's' claims to originality cannot, therefore, be accepted in full. Defoe borrowed from several books, often without acknowledgement, sometimes taking considerable pains to disguise his source by paraphrasing it freely or by interpolating matter of his own in a borrowed passage. But in a work of some 350,000 words these debts are of marginal importance. Nine-tenths of the 'Tour' was wholly original, including, of course, the whole of its author's very characteristic outlook, as well as almost all his general ideas and almost all his information about industry and trade. In this latter sphere his choice of material was often, perhaps deliberately, complementary to that of other topographical writers. Except for a single apparently accidental instance,[39] he preferred to ignore the valuable and relatively modern commercial information included in the 1695 revision of the 'Britannia;' and his writing on economic topics certainly owed nothing to the works of Brome, Moll or Coxe, or to the natural historians inspired by Robert Plot.

In conclusion it may be recalled that much of the 'Tour's' economic content could not have been derived either from books or from casual visits; it required knowledge of the facts and figures of the business world. Many of Defoe's statistical statements are obvious estimates, often little better than guesswork, as he readily admitted. But although his absolute figures are usually unreliable, his varied trading activities had taught him a lot about the relative importance of different industries and different commercial and industrial centres; his chequered business career, which continued until the middle 1720's, had made him at different times a hose-factor, a shipowner, an importer of wine and tobacco, a civet-cat breeder, a pantile manufacturer and a dealer in wool, oysters, cheese and salt. More than this, he commanded documentary sources beyond the scope of the conventional topographical writer. The 'Tour' reveals him as a keen though unsystematic reader of press reports, parliamentary bills and petitions, and reports by parliamentary committees on industry, trade and navigation; he himself was associated with at least one navigation scheme, for opening the River Don to Sheffield in 1723.[40] At several stages in his writing career he secured access to unpublished trade and shipping figures. In 1706–7, for example, he made a special study of Scottish trade,[41] and in writing the *Mercator* (1713–14) he had access to "the public papers of the Custom

House."[42] He returned to statistical research in the 1720's. Besides the 'Tour,' this was the period of his most intensive work on economic geography—the 'Complete English tradesman' (1725–6), the 'Brief deduction of the original, progress and immediate greatness of the British woollen manufacture' (1727), the 'Plan of the English commerce' (1728) and the monumental 'Atlas maritimus' (1728). In compiling these works he seems to have been given the freedom of the London import and export figures, but was apparently unable to obtain complete statistics for the outports; this gap he partly filled, however, by consulting records of shipping insurance at the various ports.[43] We do not know how much of this work was done during the writing of the 'Tour;' and in any case it would be easy to exaggerate Defoe's use of statistical material: he worked too quickly and too unsystematically to spend much time on research or calculation. Nevertheless, his remarks on the geographical pattern of English trade usually show a close correspondence with surviving official statistics.[44]

A close study of the 'Tour' shows that Defoe cannot be acquitted of deliberately deceiving his readers. His first-hand knowledge of Britain was indeed extraordinary, but it was neither as extensive nor as up to date as he pretended. The 'Tour' was not a work of scholarly research but a collection of memories of different dates, hastily assembled and given a garnishing of borrowed detail to lend conviction to its weaker sections. But the material of most interest to historical geographers was almost wholly original, and derived either from personal observations or from long standing contacts in the world of industry and commerce. In spite of its weaknesses the 'Tour' remains a great pioneer work of economic geography.

NOTES

[1] Internal evidence shows that the 'Tour' was written between 1722 and 1726 in the order in which we now have it. It was first published anonymously in three volumes dated 1724, 1725 and 1727, illustrated by two road maps, of northern and southern Britain, by Herman Moll, a plan of the siege of Colchester in 1648 and three diagrams. None of the changes in the eight subsequent editions, which appeared between 1738 and 1779, were due to Defoe. G. D. H. Cole's edition of 1927 adheres faithfully to Defoe's original text, with corrections of obvious misprints, but Cole shortens and alters Defoe's long title and includes a set of county maps absent from the original. Cole's Everyman's Library edition of 1928 omits the tour of Scotland, together with those portions of the index and the preface to the third volume that relate to Scotland. Extracts from the 'Tour' have been reprinted from time to time, but except for M. M. Beeton and E. B. Chancellor's 'A tour thro' London about 1725' (1929), which has notes on mainly architectural topics, no part of the book has appeared with modern notes, index or other editorial apparatus.

[2] Vol. 3, p. viii, in original edition. This passage is omitted from the Everyman's Library edition.

[3] S.E.W., review of the 'Tour.' *Geogr. J.* 71 (1928) p. 287. W. G. East in H. C. Darby (Ed.) 'An historical geography of England before 1800,' 1936, p. 518; and 'The geography behind history,' 1938, p. 83. W. Smith, 'An economic geography of Great Britain,' 1949, p. 38.

[4] Singer, H. 'Daniel Defoe: a tour through England and Wales: eine kulturgeschichtliche Studie,' 1938, is a general survey of early eighteenth century economic history rather than a critique of the 'Tour.' G. Davies, 'Daniel Defoe's Tour through the whole island of Great Britain,' *Modern Philology* **48** (1950–1) pp. 21–36, is concerned chiefly with the work of later editors in revising the subsequent versions of the book.

[5] Of Defoe's many biographers only two deal with his travels in any detail. P. Dottin, 'The life and strange and surprising adventures of Daniel Defoe,' 1928, gives a detailed but highly fanciful reconstruction. J. R. Moore, 'Daniel Defoe, citizen of the modern world,' 1958, gives a summary based on Defoe's own statements.

[6] Defoe's statement (II, 35) that he had drunk the waters of Bath fifty years ago may imply only that he had drunk them in London in bottled form.

[7] Bastian, F. "Daniel Defoe and the Dorking district," *Surrey Archaeological Collections*, **55** (1958) pp. 41–64.

[8] Defoe, D. 'An appeal to honour and justice, though it be of his worst enemies,' 1715, p. 28.

[9] Wright, T. 'The life of Daniel Defoe,' 1931 (first published in 1894), pp. 290, 325, seems to have originated this theory which is repeated by Dottin (p. 239) and Singer (p. 2).

[10] Defoe, D. 'The great law of subordination considered,' 1724, pp. 47, 50.

[11] The ship that Defoe saw launched at Ipswich (I, 45) was perhaps the one of which he was part-owner in 1688. (J. Sutherland, 'Some early troubles of Daniel Defoe,' *Review of English Studies* **9** (1933) p. 276.)

[12] The king's journeys in 1690 included stops at Tring, Lichfield, Chester and Liverpool, and the progress of 1695 included Althorpe, Stamford, Boughton and Burleigh, all of which received more than average emphasis in the 'Tour.'

[13] Wilson, W. 'Memoirs of the life and times of Daniel Defoe,' 1830, Vol. 1, p. 221.

[14] 'Appeal to honour and justice . . .' p. 6.

[15] Defoe, D. 'An essay on projects,' 1697, p. 109. Defoe's experiences at Steyning reappear in *A review of the state of the British Nation*, 5 June 1711, and in his novel 'Colonel Jack.'

[16] Defoe, D. 'The freeholder's plea against stockjobbing elections of parliament men,' 1701, pp. 15–16.

[17] Defoe, D. 'A history of the Kentish petition,' 1701, printed in E. Arber, 'An English garner,' Vol. 7, 1883, p. 567. Wright, *op. cit.*, p. 64.

[18] Defoe, D. 'The Storm: or, a collection of the most remarkable casualties and disasters which happened in the late dreadful tempest both by sea and land,' 1704, pp. 70, 135–6, 152.

[19] Historical MSS Commission, *Portland MSS*, Vol. 4, p. 93.

[20] 'Essay on projects,' p. 61.

[21] Healey, G. H. (Ed.) 'The letters of Daniel Defoe,' 1956, pp. 57–9. Defoe also described this journey in articles in the *London Post*, 14 and 21 May 1705.

[22] Healey, *op. cit.*, p. 101 n.3 For other contemporary records of this journey see T. B. Groves, "Daniel Defoe in Dorsetshire," *Proc. Dorset nat. Hist. Fld Cl.* **2** (1878) pp. 67–75, and for Liverpool, T. Heywood (Ed.) *Norris Papers*, Chetham Society, 1846, pp. 144–5.

[23] A detailed reconstruction of Defoe's route across Blackstone Edge is attempted by W. B. Crump, "Halifax visitors' book," *Trans. Halifax Ant. Soc.* (1937) pp. 37–9.

[24] Manley, G. 'Climate and the British scene,' 1952, p. 260.

[25] 'Appeal to honour and justice . . . ' p. 25.

[26] Walls, C. "Defoe and Selkirk at Bristol," *Academy*, **69** (1905) p. 1357.

[27] Watson, J. 'History of Halifax,' 1775, pp. 470–1. Wright, *op. cit.*, p. 184. Wright considers that Defoe visited Halifax in 1718 and ascribes this opinion to a Yorkshire historian, the late W. B. Crump; but Crump's two published papers on Defoe make no reference to any visit at this time.

[28] Defoe apparently visited Hampshire after the reign of William III (I, 140). He seems to imply that Richard Cromwell still owned the Hursley estate at the time of his visit. Cromwell died in 1712, and the estate was sold in 1718, though not to the person mentioned as the purchaser by Defoe. For Defoe's Palatine scheme see O. F. W. Fernsemer, "Daniel Defoe and the Palatine emigration of 1709," *J. Engl. Germ. Philol.* **19** (1920) pp. 97–124.

[29] *Review*, 22 February 1711.

[30] Defoe, D. 'The Bristol riot,' 1714.

[31] A large selection of Defoe's newspaper articles from 1716 is given in W. Lee, 'Daniel Defoe: his life and recently discovered writings,' 1869, Vols. 2 and 3.

[32] Near Drumlanrig in Dumfriesshire (Healey, *op. cit.*, p. 181, n.2).

[33] Defoe had special connections with Norwich, where his son was married in 1718 and his grandson baptized in 1719; and with Colchester where he leased land in 1722 and attempted to organize a brick-making business in 1724–5.

[34] The statue in the Market Place (I, 74) was not of William III but of James II. This error was noticed by a tourist of 1735, who added: "This is not the only lie in that author's book." (Historical MSS Commission, *Portland MSS*, Vol. 6, p. 162.)

[35] *Mercurius Politicus*, 1716, p. 296. According to M. Barton ("Tunbridge Wells,' 1937, p. 191) the 'Tour's' description of Tunbridge Wells contains no information that had not already appeared in print.

[36] Mist's *Weekly Journal*, 31 December 1720. For another reference by Defoe see 'The complete English tradesman,' 1726, p. 60.

[37] Defoe makes the following errors in describing this incident, which he says had happened "newly" when he was in Coleshill. The priest who had refused to take the oath was not, as he says, the last incumbent, but the last but one, who had resigned the living in 1690. He leaves a blank instead of writing the name of the proclaimed man. And Carte was not the successor

of the late incumbent; he lived with the curate of Coleshill and occasionally acted as clergyman. Defoe may have heard this story from John Ward, who belonged to the one family of Whigs mentioned at Coleshill in the 'Tour' and who had business dealings with Defoe in Colchester in 1724–5. There is no evidence that Defoe ever visited Coleshill in the course of his dealings with Ward (*Protestant Dissenters' Magazine* **4** (1797) p. 241. A. J. C. Guimaraens, "Daniel Defoe and the family of Foe," *Notes and Queries*, 11th series **5** (1912) pp. 241–3. The statement of Dottin and Wright that Defoe visited Coleshill in 1712–13 is based on a misreading of the first of these sources.)

[38] Andrews, J. H. "Defoe's 'Tour' and Macky's 'Journey'," *Notes and Queries* **205** (1960) pp. 290–2.

[39] A passage from the 'Britannia' seems to have found its way into Defoe's account of Beverley by mistake (J. H. Andrews, "A case of plagiarism in Defoe's 'Tour'," *Notes and Queries* **204** (1959) p. 399.)

[40] Greene, D. "Daniel Defoe's letters," *Notes and Queries* **187** (1944) p. 109.

[41] Defoe, D. 'The history of the Union of Great Britain,' 1709. Healey, *op. cit.*, pp. 145–217, 278–85.

[42] King, C. 'The British merchant, or commerce preserved,' 1721, p. x.

[43] 'Atlas maritimus & commercialis,' 1728, p. 165. The greater part of the text of this little-known work has been established as Defoe's by Prof. J. R. Moore ("The canon of Defoe's writings," *The Library* **11** (1956) p. 167).

[44] Andrews, J. H. "Some statistical maps of Defoe's England," *Geographical Studies* **3** (1956) pp. 33–45.

[45] Healy, *op. cit.*, pp. 102, 104, 108–113.

[46] *Ibid.*, pp. 125–391: D. Defoe, *Review*, 8 October 1706, 13 October 1709; J. R. Moore, 'Daniel Defoe,' pp. 351–2. In August 1712 Defoe expressed the intention of visiting "the Bath in Derbyshire" (*i.e.* Buxton or Matlock) on his next northern journey, but it is not known whether he did so.

EUROPE: HOW FAR?

W. H. PARKER

CONTROVERSY AND CONFUSION over the eastern boundary of Europe are as old as the name itself. Such confusion was inevitable after the western extremities of the Eurasian land mass had come, mainly through geographical ignorance, to be considered as a separate continent. This confusion could only become worse confounded when the word Europe, besides its use as a geographical name, began to express a distinctive culture or community of fluctuating extent. These two Europes, geographical and cultural, have seldom coincided.

I

If the name Europe, as some believe, is derived from the Assyrian-Phoenician *ereb* (sunset) and Asia from *acu* (sunrise), the earliest distinction between Europe and Asia may simply have been an elaboration of West and East, Occident and Orient.[1] Or it may have originally represented one of two relatively small but adjacent and contrasting areas separated perhaps by the Sea of Azov, perhaps by the Hellespont.[2] When first mentioned by the Greeks,[3] Europe appears as the land along the north shore of the Aegean and is distinguished from Greece proper. This is the meaning given to it by Xerxes when he says: "I am about to span the Hellespont and lead an army through Europe against Greece."[4] Libya or Africa, to the south, formed the third division of the world. These divisions seemed quite arbitrary to Herodotus who was "not able to understand wherefor the earth, which is one, hath been given three several names."[5] Nor was he sure that Europe was a continent in the sense that it was surrounded by water. That was true of Asia and Africa, "but of Europe it is known by no man whether it hath the sea around it, either towards the rising sun or towards the north."[6] Thus Europe was to the Greeks primarily a geographical term, but even thus early it was occasionally endowed with emotional undertones: Europe was to Asia as Greece to Persia.[7]

The earliest boundary between Europe and Asia was formed by the Hellespont, the Sea of Marmora, the Bosphorus, the Black Sea, the isthmus between the Black and Caspian Seas, and the Caspian Sea; the latter was sometimes envisaged as a large gulf connected with the great ocean surrounding the earth[8] (Fig. 1). Europe thus extended indefinitely eastwards to the north of Asia. This was later superseded by a boundary using the Black Sea, the *Palus Maeotis* or Sea of Azov (whose size and northward penetration were greatly exaggerated so as to leave only a narrow isthmus between it and the northern ocean) and the River *Tanais* (Don).[9] The Don was made to flow southward across the isthmus; sometimes it connected the northern sea with the *Palus Maeotis*; sometimes it was given a source in the *Montes Riphaei* which paralleled the shore of the northern ocean[10] (Fig. 2). From these mountains another river was occasionally made to flow northwards to the northern sea and this stream then also formed part of the boundary.[11] This classical boundary lay across part of the world about which very little was known and where fantasy took the place of fact.[12] The vast expanse of Russia was whittled down to an isthmus such as might suitably divide one continent from another. The short and winding Don, instead of emerging from a low marshland, had become a great river comparable to the Nile and issued forth from a notable mountain chain.

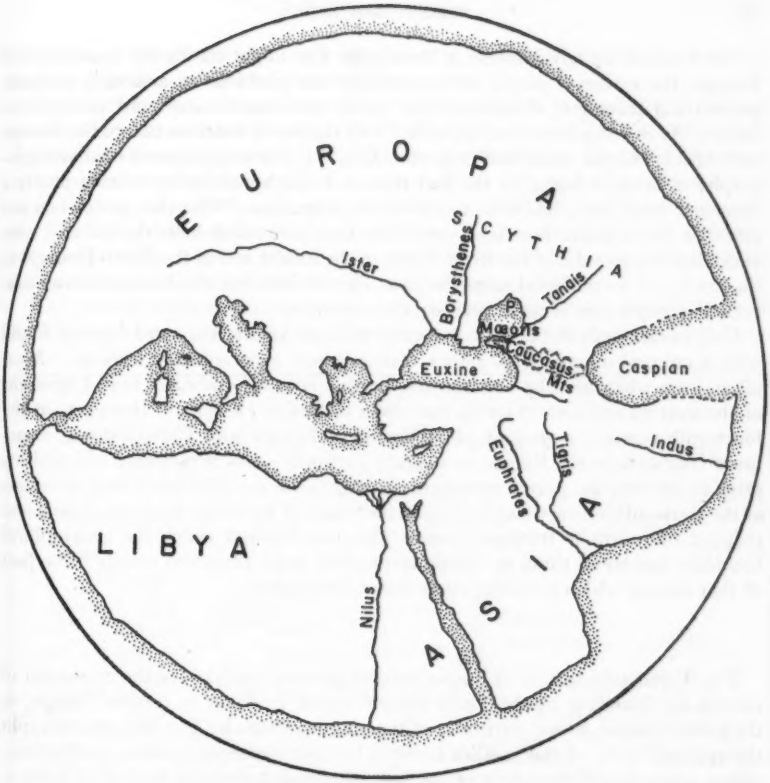


Fig. 1. The World according to Hecataeus, c. 500 B.C. (after Bunbury)

Fig. 2. The World according to Pomponius Mela, A.D. 43 (after Bunbury)

Far from seeing any increase in knowledge that might clarify the boundaries of Europe, the medieval period often simplified the problem by assuming a simple geometrical three-fold division of the world into a semi-circle and two quarter circles. As St. Augustine neatly put it, "half the world contains two parts, Europe and Africa, and the other half only one, Asia."[13] The stagnation of medieval geography is brought home by the fact that an English chronicler, writing nearly a thousand years later, had little to add to St. Augustine: "The thre partes ben not alle even lyke moche. For Asya, one of the thre, containeth halfe the erthe . . . his endes ben the mouthe of the River Nylus in the southe and of the River Thanays in the north."[14] In medieval maps the Don, like the Nile and the Mediterranean Sea, became a major arm of water dividing the continents.

Only occasionally in the dark and early Middle Ages is the word Europe found with a cultural or emotional rather than a purely geographical meaning.[15] Most often, even when used by ecclesiastics, Europe not only embraces both Christians of the western and eastern faiths, but also a barbarian element.[16] However, in the fourteenth century, a growing identification of Europe with Christendom—sometimes restricted to the Roman or western part only—was perceptible and took its place along with the purely geographical term.[17] Meanwhile, the Tartar invasions of the thirteenth century had destroyed the whole of Christian southern Russia and reduced the north to tributary status. The area through which the geographical boundary ran lay in thrall to Asiatic conquerors and had ceased utterly to be part of that Europe which identified itself with Christendom.

II

The Tartar subjugation of Russia and the growing conquest of the remainder of eastern Christendom by the Turks reinforced the tendency to restrict Europe, in the cultural sense, to the territories of the western Church. The Reformation split the spiritual unity of this smaller Europe, but homogeneous systems, institutions, usages and habits of thought, and one language among educated men of all nations, preserved community within it. The Renaissance reinforced the Mediterranean traditions which its peoples had in common, and the discovery of strange and barbarous worlds overseas, together with rapid advance in the arts and sciences, gave its peoples a feeling of confidence and superiority. Whatever the geographers might say, Europe was the territory inhabited by those peoples whose astounding achievements were so enthusiastically portrayed by Purchas and others.[18] Russia could not be accepted as part of this Europe, and her territories and inhabitants were described in terms not so very different from those of the recently discovered lands overseas. Even after the Tartar yoke had been cast off, the Russian State continued to develop on Asiatic rather than European lines.[19] When Herberstein visited Russia early in the sixteenth century he saw himself as venturing into Asia.[20] Rabelais lumped the Muscovites along with Turks and Tartars as Asiatic.[21] Sully, the minister of Henry IV of France, hesitated to include Russia in his European republic: its people were "in great part still idolaters, and in part schismatics" so that "there scarce remains any conformity among us with them; besides they belong to Asia as much as to Europe. We may indeed almost consider them as a barbarous country, and place them in the same class with Turkey."[22] Throughout the sixteenth and seventeenth centuries, the Russians are depicted as backward and barbarous. English writers of the period were agreed in considering them as submissive, idolatrous, cruel, uncivilized and very much akin to savages; to cross the line from Russia into Sweden was to cross more than a mere international frontier; it was, "after a tedious association with a people barbarous and rude, to

fall amongst those who were civil and urbane."[23] The conclusion was naturally to deny that Russia was really part of Europe.[24]

Thus for centuries, at least from the western point of view, the frontiers between Sweden, Poland and Austria on the one hand, and Russia and Turkey on the other, formed the eastern boundary of the European community. But the Renaissance geographers inherited through Ptolemy the classical view of Europe which is once again shown or described as a peninsula attached to Asia by a narrow isthmus, with the River Don forming the boundary and flowing southwards from the Riphaean Mountains to an elongated Sea of Azov, and with sometimes another river flowing northwards from these mountains to the northern sea.[25] (Fig. 3.)

The mid-fifteenth century saw one remarkable exception to the ignorance of Russia evident on all medieval and classical maps and their Renaissance imitations.

Fig. 3. Part of the map of the World by Grynaeus, Basel, 1532

The Mappamundi of Fra Mauro, 1459, in its portrayal of Russia, is far ahead of its time. The Don is made to flow from a lake (not from the Riphaean Mountains) into a reasonably accurate Sea of Azov. A long Volga flows to the Caspian Sea, and it is this Volga, not the Don, that is suggested as the boundary between Europe and Asia.[26] During the sixteenth century, geographical knowledge of Russia increased sufficiently for it to be realized that there was no narrow isthmus but a general eastward broadening of Europe into Asia; and that the Don was a relatively small river confined to the southern part of Russia and not in itself capable of forming the eastern boundary of the continent. Geographers were faced with the problem of reconciling classical authority with geographical reality. The results were found to be unsatisfactory: firstly, because they were arbitrary and academic boundaries bearing no relationship to what Europe meant to most people and, secondly, because they divided Russia into two.

From attempts by geographers to adapt the classical boundary to this growing knowledge of Russia, there came several boundaries, each of which predominated

for a period. But it must be stressed that, although there were at various times prevailing boundaries, each had many variations and rival lines continued to appear. There was never general agreement about any particular boundary. The problem of the great expanse of Russia northwards from the sources of the Don was at first solved by drawing a straight line until it met the White Sea at Archangel or its vicinity (Fig. 4). This was the prevailing view in the late fifteenth and throughout the sixteenth century. It was used by Pope Pius II (d. 1464) and by Ortelius in 1570; it was deliberately chosen by Purchas and by Brietius in the seventeenth

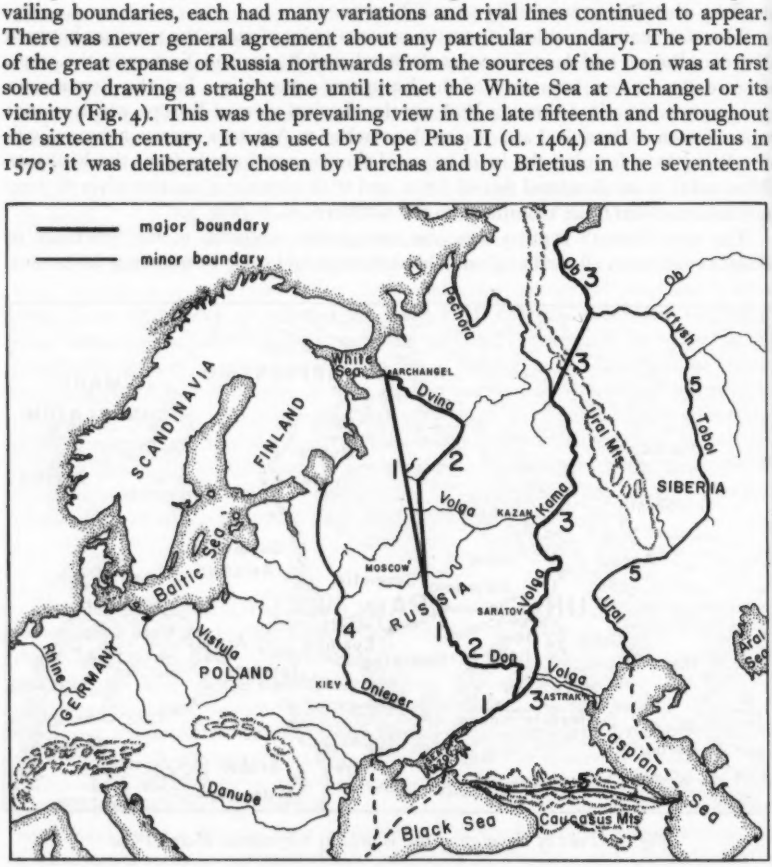


Fig. 4. Some sixteenth and seventeenth century boundaries: 1. Don–straight line–White Sea (Ortelius 1570). 2. Don-Dvina (Thevet 1575). 3. Don-Volga-Kama-Ob (Cluverius 1616). 4. Dnieper–Lakes Ladoga and Onega–White Sea (Sanson 1650). 5. Ob-Irtysh-Tobol-Ural River (Valck 1680)

century despite the claims of newer alternatives.[27] Two other boundaries were favoured by most seventeenth century geographers: the Don-Dvina line and the Don-Volga-Kama-Ob line. As the century progressed, the latter gained in popularity and by the end of the seventeenth century it had established itself as the usual boundary, a position which it held well into the eighteenth. Two lesser seventeenth century alternatives were a Don-Volga-Pechora line,[28] and a line drawn from the Don bend straight to the mouth of the Ob.[29]

It was natural that, as knowledge of northern Russia spread, one of the north-flowing rivers should take the place of the straight line of the earlier boundary, especially as there was classical authority for such a river.[30] If a north–south line

was to be maintained it was simplest to link the sources of the Don with the Dvina. This was done by Thevet in 1575, by Quade in 1596 and by several seventeenth century writers and cartographers.[31] Among these was Peter Heylyn: "Europe is joined to Asia by that space of earth which is between the heads of the Tanais and Dvina."[32] Although Ortelius in his maps and texts of Europe consistently gives the Don–straight line–White Sea boundary, the introduction of the Don-Volga-Kama-Ob line has often been ascribed to him, apparently through a misunderstanding of the text of his Asia map.[33] The first deliberate claim for this line came from the pen of Philip Clüver, who has been called the "father of historical geography."[34] In the first chapter of his 'Germania Antiqua' he discusses the problem of the eastern limit of Europe at great length. Retaining the Don in the south, and relying mainly on Pliny, he tries to prove that the river Ob is the northern part of Europe's eastern boundary.[35] His arguments are not really convincing and were rejected and refuted by Brietius and Riccioli. Nevertheless, the Ob line won wide acceptance and by the end of the century could be termed "the most common opinion."[36] It was adopted notably by Moretus in his revision of Ortelius, by Baudrand and Moreri in France, and by Wells and Moll in England, where it survived at least until 1797.[37]

Although classical authority was throughout this period the main factor in determining the European boundary, political considerations became of increasing weight. Thus the Don-Volga-Ob line was justified by Clüver not only because it allegedly had the best classical basis, but because "the whole of Great Russia, which is also called Muscovy, is thus contained in one Europe, whereas hitherto the greater part of it has been placed in Asia by the geographers of our age, using a line drawn from the Don source to the White Sea, which they derived from the erroneous belief of Ptolemy."[38] This injection of a political element into the controversy came during a period of rapid Muscovite expansion; the boundaries of Russia were not only in a state of flux, but because of the difficulty in obtaining accurate information owing to Russian secrecy or ignorance, exceedingly difficult to determine. Consequently numerous boundaries are now found in pursuit of the chameleonic Russian political frontier. Duval tells of those who include in Europe "the conquests of the Great Duke of Muscovy which he made in the Asiatic Tartary."[39]

As a political boundary, the Don-Volga-Kama-Ob line had been outdated, even before its inception, by Ivan the Terrible's sweep down the Volga which culminated in his wresting Astrakhan from the Tartars in 1566. As this knowledge began to reach western geographers, new but inevitably inaccurate and anachronistic lines began to appear. From the Black Sea various lines are followed to the Volga delta or the Caspian, thence northwards, usually to the Ob[40] (Fig. 4). Brietius in 1648 mentions

> "those who greatly expand Europe and to the above boundaries add the Caucasus Mts. . . . part of the Caspian Sea to the mouth of the Ural river . . . from the source of which they direct a line to the vicinity of the River Ob and use the rest of the Ob as far as the Northern Sea; thus they include the whole Muscovite state within Europe."[41]

Descriptive geographies of this period usually dealt with Russia or Muscovy under Europe, normally at the end of their treatment of that continent.[42] However, they often noted that it was not all in Europe, as did the author of 'A Prospect of the Most Famous Parts of the World,' published in 1668: "Muscovia is the last region of Europe towards the east, and indeed stands a good part in Asia," and he breaks off his description of the country abruptly with the excuse: "But I must not pass too far this way. I have already set foot into Asia."[43] The division of Russia into European

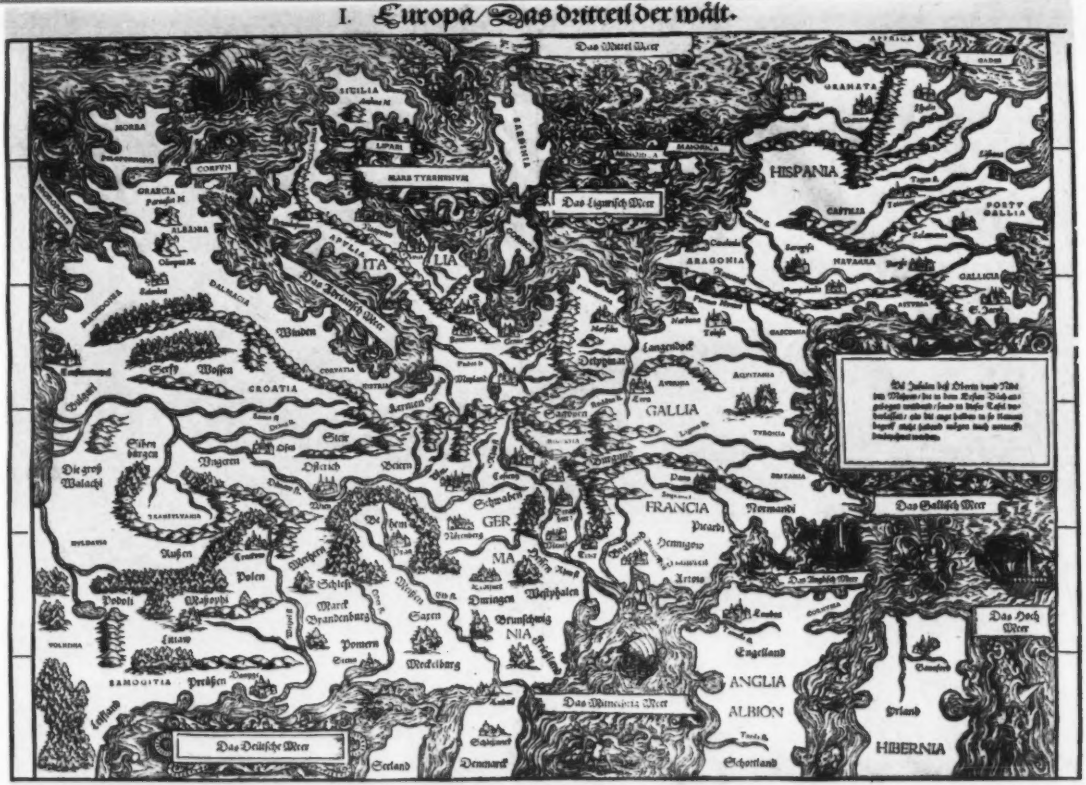
and Asiatic sections, which survives today, had good authority in antiquity, despite Clüver's denial. The river Don traditionally divided "Sarmatia," as the ancients called the territory, into European and Asiatic parts.[44] Thus geographers like Brietius and Delisle, who disdained the political lines, preferring the Don–straight line–White Sea or Don-Dvina, were not perturbed because their boundaries divided Russia.

It should be noted in concluding the discussion of this particular period that some geographers and map-makers excluded Russia altogether, probably on cultural grounds, though this meant completely abandoning classical precedent—a difficult innovation to make in the intellectual climate of the time. The French geographer Rigaud in his 'La Division du Monde' (1560) placed "Ruthie, Russie ou Rassie" among the regions of Asia.[45] Both Paulus Merula (1605) and Brietius (1648) refer to geographers who use the Dneiper–Lake Ladoga–Lake Onega–White Sea boundary, "thus adjudging the whole Muscovite state to Asia."[46] Sanson, the French royal geographer, also placed the whole of Muscovy in Asia.[47] Tacit support for this view comes from contemporary maps of Europe. In the early and middle sixteenth century, they usually stop short of Russia, possibly for lack of information. When, in the late sixteenth and throughout the seventeenth into the eighteenth centuries, they embrace at least part of Russia, there is a notable difference between the detail of the maps on either side of the Russo-Polish frontier. To the west, the maps are filled with minute detail; eastwards their nature changes abruptly; there is little detail and most of the space is filled with symbolic forests.[48] As the period progresses, this contrast softens (see Plates between pp. 284–5).

In view of their future importance it is reasonable to ask, at this point, why the Urals played no part in this boundary-making. Von Herberstein, an early sixteenth century visitor to Russia, discovered the Urals for the west. They are shown on his map as a short, straight, but distinct range running north–south between the Ob and the Pechora, and Ortelius so placed them on his maps of Europe from 1570 on (Plate 3). Clüver confused the issue by asserting confidently that the *Riphaei Montes* of the ancients lay east–west, along the shores of the northern sea from the White Sea to the Gulf of Ob. To this imaginary range he gives the old Russian name for the real Urals, *Kameny poyas* or Stony Girdle. The real Urals he dogmatically dismisses from the discussion on the grounds that they are not the *Riphaei Montes*.[49] When Moretus revised Ortelius's maps in 1624, he not only substituted the Cluverian Ob boundary for the Don–White Sea line, but took out the genuine Urals based on Herberstein's observations and put in Clüver's imaginary ones. By and large, however, seventeenth and early eighteenth century map-makers ignored them: the Urals are absent both from their maps and from the boundary controversy.[50]

III

Early in the eighteenth century, the attitude of Europeans to Russia underwent a change and she was accorded grudging acceptance as a member of the European community. This period, during which Russia was widely recognized as part of Europe in a more than purely geographical sense, may be taken from the Peace of Nystadt in 1721 to the Revolution of 1917. The main reason for the alteration was the drastic europeanization of the Russian court and aristocracy carried out by Tsar Peter I after his return from his European tour. The manners and customs, the arts and crafts, the language and literature of the West were forced upon the upper stratum of society, so that visitors from Europe could, for the first time, feel more or less at home in the country. A new capital, Petersburg, was built in imitation of London, Paris and Vienna. A European model army was created which, after



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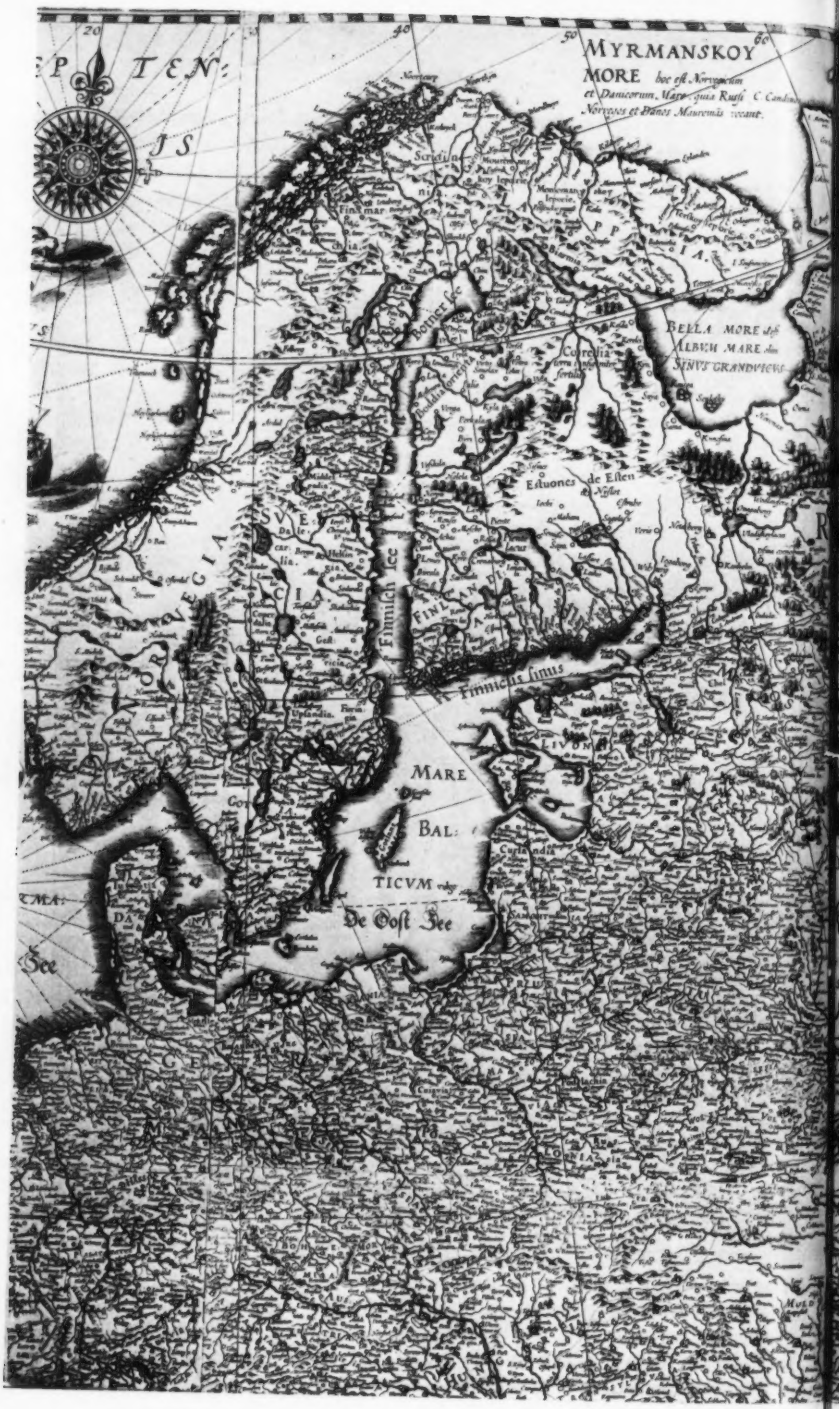
Map of Europe in Johann Stumpf's Landtafeln, *Zürich, 1562*



Part of Rumold Mercator's Map of E

Mercator of Europe, 1608

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By permission of the Trustees of the British Museum

Part of the map of Europe in Ortelius's Theatrum, *1570*

the defeat of the Swedes at Poltava in 1709, introduced Russia as a leading European power. In 1735 a Russian army put Augustus III of Saxony on the throne of Poland. It was no longer possible to write the political history of Europe without reference to Russia.[51] Whereas Sully, a century before, had not thought it advisable to include Muscovy in his supra-national Europe, the Abbé Saint-Pierre now thought it "convenient and even necessary for the tranquillity and security of the Society in general . . . to suffer the Czar to enter the Union." He is apologetic about it, however, for he knows "that the Christianity of his dominions is very different from that of ours, but they hope for salvation through Jesus Christ; therefore they are Christians." And if this appeal to charity should not suffice, it would still be wise to have the Russian "in order to save the expense of keeping upon the guard against him."[52] The Paris 'Almanach Royal' in 1716 ends its list of European states with Poland, but in 1717, for the first time, "Moscovie" appears after "Pologne."[53] Many European philosophers entertained high hopes of Russia's cultural promise and saw her as a missionary for civilization to Asia.[54] Having overthrown Napoleon's might, she seemed to achieve the summit of respectability as a member of the Holy Alliance—a resurrection of the early European idea of a Christendom embracing Latin, Teuton and Slav alike. Russian music, literature and even science contributed to European civilization in the late eighteenth and nineteenth centuries.

The europeanization of Russia and her acceptance by the West were both superficial. Only the upper layers of Russian society were affected; the "Asiatic mass,"[55] far from benefiting from western culture, sank deeper and deeper into a misery and degradation such as no European peasantry had ever known. A vast empire, unbridled despotism and extreme servitude were, as Montesquieu pointed out, Asiatic rather than European characteristics,[56] and we still find Europe contrasted with rather than including Russia.[57] If Russian power and influence in Europe increased, so did an answering resentment; Rousseau and other French publicists warned that Europe must be on her guard against "Asiatic" Russia.[58] In Germany, Ranke suggested that Russia was too deeply affected by Asiatic conditions to form an integral part of Europe.[59] Nothing could give Russia that common Graeco-Latin heritage which the other European peoples shared and she did not. It was not entirely a matter of Western rejection of Russia. Powerful influences in Russia, notably the Slavophil movement, were opposed to the European nexus and hoped Russia would develop her own indigenous culture. To the average Russian, just as to Peter I when he spoke of needing a "window looking on Europe," Europe was something apart.[60]

By an interesting coincidence, the same Battle of Poltava (1709) and Treaty of Nystadt (1721) which announced Russia's militant arrival on the European stage, also contributed to the next great change in the eastern boundary of geographical Europe. A Swedish officer, taken prisoner at Poltava, spent thirteen years in Russia until his release after the Peace. While there, he diligently studied the geography of the Tsar's realm and at Stockholm in 1730 published the book in which he claimed that the Ural Mts, not the Ob, were the real eastern limit of Europe. He justified his new approach on the grounds that there was now such confusion that many map-makers were not even attempting to draw a boundary.[61] He dismisses the Ob as having been chosen for various inadequate reasons: because it was thought to be the political boundary of Russia, which it was not; because, in ignorance of the existence of the Urals, the Ob had seemed a good demarcation; and because geographers thought Asia, being so much larger, could afford to be generous to Europe.[62]

The Urals, Strahlenberg contended, could be justified on excellent geographical grounds and his work is doubly important because he not only introduced a new boundary, but based it mainly on factors of physical geography, rather than on political or classical grounds. The Urals were not merely a watershed but divided land of different slope and elevation: on the Asiatic side great rivers flowed northwards, while on the European side they flowed both north and south; there were, he alleged, important differences in the plant, animal and mineral geography of either side.[63] He also invoked classical authority as the Urals were "without doubt" the *Montes Riphaei* of the ancients.[64] Having taken the Urals, Strahlenberg resolved the problem of where to go when their southern end was reached, by looking for an elevated line. He branched westwards along the Obshchí Syrt, which he regarded as a branch of the Urals, and then took the high right bank of the Volga until he reached the Don[65] (Fig. 7A). Strahlenberg's Ural boundary was accepted by most geographers, particularly after the Russian Pallas gave it confirmation and support in 1771.[66] For Kant, in 1802, it was the natural dividing line between the two continents on physical, economic and human grounds.[67] Malte Brun, in 1811, acclaimed it as "an unquestionable principle that the chain of Ural or Verchotian Mts. marks the natural division between Europe and northern Asia."[68] Because they were "a chain of mountains at least as considerable as the Alps" they were "without a doubt the natural dividing line between Europe and Asia."[69] This "grand natural limit"[70] was possibly favoured by the Romantic Age as representing a "back to nature" move in geography away from classical or political considerations.

There was less agreement about the continuation of Strahlenberg's boundary between the southern end of the Urals and the Black Sea–Caucasus–Caspian zone where the steppes are interposed and where, according to Humboldt, Europe gradually merges into Asia without any marked dividing line.[71] The connection between the Urals and the Don was made in several ways. The most popular followed the Kama to the Volga instead of using the Samara[72]; some preferred to maintain an elevated line all the way by continuing from the Volga Heights along the Ergeni Hills to the Caucasus[73]; but the chief rivals to the Strahlenberg-Pallas line were those that went from the southern end of the Urals to the Caspian Sea, using either the River Ural or the River Emba, or occasionally the divide between them. Variations of the Ural-Volga-Don boundary prevailed throughout the last quarter of the eighteenth century, having largely ousted those which used the Ob. They continued to dominate texts and maps in Germany and Britain until about 1840. Ritter, who died in 1859, argued for the Strahlenberg line as the natural boundary of Europe.[74] This Ural-Volga-Don line is found in Germany down to 1879, but by then it had lost general support.[75]

IV

The Ural Mountains–Ural (or Emba) River–Caspian–Caucasus boundary that is conventional today was introduced in France early in the nineteenth century. Occasionally the depressions within and north of the Caucasus, rather than the mountains themselves, carry the line from the Caspian to the Black Sea (Fig. 7C). In 1803, Mentelle and Brun, after mentioning that "there is no agreement on the boundaries to be given to Europe," put forward a Urals-Emba-Caspian-Caucasus line. They attacked the Strahlenberg-Pallas boundary, although it had been "welcomed by all the German geographers," because it arbitrarily cut the Volga basin in two.[76] In 1811, Malte-Brun gave what is probably the earliest textual enunciation of the so-called "traditional" Urals-Ural-Caspian line.[77] At about the

same time Hérisson published in Paris what may be the first cartographic portrayal of that boundary.[78] It appears on Lapie's map in 1812, and in almost all subsequent French atlases and texts. German geographers, however, only occasionally took this line, the majority following Strahlenberg. No English map appears to have carried the Urals-Ural line until that published by the Society for the Diffusion of Useful Knowledge in 1844 and Wyld's map of 1845. The first English text to use it may have been Gilbert's 'Geography' of 1846.

The welcome accorded to the Urals was by no means unanimous. There were objections from those who denied that there were such striking physical differences between one side and the other and from those who insisted that the Urals formed a whole and should not be divided.[79] These objectors sometimes postulated

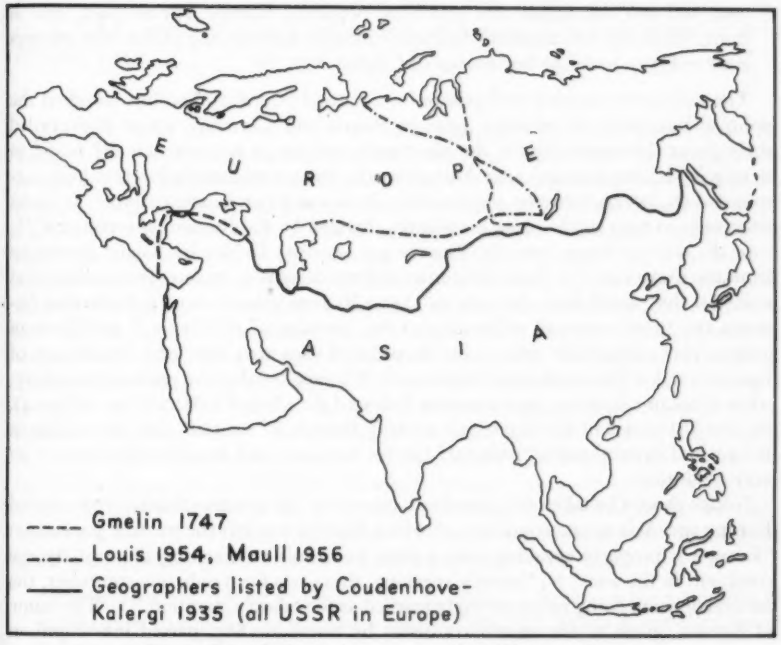

Fig. 5. Boundaries giving part or all of Siberia to Europe

boundaries running east of the Urals in the Ob-Irtysh-Tobol-Caspian depression (Fig. 7D): they argued that there had been sea here in recent geological time, dividing Europe from Asia. The French geographer Reclus asserted in 1875 that:

> "the true zone of separation between Europe and Asia is not formed by mountain systems but, on the contrary, by a series of depressions, once wholly filled by an arm of the sea which joined the Mediterranean with the Arctic Ocean."[80]

A similar viewpoint was expressed by Wisotzki in 1879, while Hahn drew his boundary along the eastern border of the Ural region "where the West Siberian plain begins."[81] The search for a natural boundary led Gmelin as far east as the Yenisei[82] (Fig. 5).

A few were not content to rely merely on physical geography but brought in human factors. Hase tried to draw a line between Slav and Tartar (Fig. 7B).

Ritter claimed that the Strahlenberg line was not only the "natural boundary," but the racial, economic and human one as well, and Hahn had similar pretensions for his own suggestion.[83] Mackinder took an individualistic approach which also ignored the Urals (Fig. 7E). He ran a line from Petersburg to the Volga, and after including the lower Kama valley, followed the Volga to the Don bend, and then the Don to the Black Sea. Behind this line lay "the real Europe, the Europe of the European peoples, the Europe which was 'a perfectly definite social conception'." He considered Russia (before the Revolution) to have been European as far as this line, the Volga high bank of which, with Strahlenberg, Pallas and Ritter, he deemed the natural boundary:

> "Stand on the top of this brink, looking eastward across the broad river below you, and you will realise that you have populous Europe at your back, and in front, where the low meadows fade away into the half sterility of the drier steppes eastward, you have the beginnings of Central Asia."[84]

The eighteenth century enthusiasm for a natural boundary had but scotched the political boundary. It emerges again in Russia and Germany where it prevailed throughout the second half of the nineteenth century; it was occasionally found in Britain.[85] Its reappearance was delayed by the secrecy and confusion that long surrounded the border between metropolitan Russia and her Asiatic empire: "it varies from map to map and is being constantly changed by the Russian government"[86]; "we do not yet know how the Russian government divides its Asiatic provinces from the European."[87] Such difficulties did not deter map-makers from using what evidence they could find. As early as 1745 a Russian atlas showed a distinction between the "governments" of Russia and the "provinces" of Siberia,[88] and German geographers particularly often took the point of view that the eastern boundary of Europe was the Tsar of Russia's business.[89] It happened that the political boundary, when it became definite, approximately followed the Urals-Ural line (Fig. 7E, line 4). So that at the end of the nineteenth century there is a "natural" line (prevailing in Britain and France) and a "political" line (in Germany and Russia) which are not so very dissimilar.

Notice should be taken of a growing tendency in the nineteenth century to regard Europe and Asia as one continent, of which Europe was but the western peninsula: "Europe is properly speaking only a large peninsula terminating the vast Asiatic continent in the west"[90]; "strictly speaking, these two form only one continent, the natural division being not so strongly marked as to make a separation."[91] The name of Eurasia, given to the united continent by Suess in 1885, passed into common use.[92] Mackinder stressed the essential unity of "Euro-Asia," while noting that around this "heartland" of the "world-island," there were four appendages: peninsular Europe, South-west Asia, China and India. Within the "Euro-Asian" heartland he included most of Russia, since the east–west alignment of climatic-vegetational belts, continued from Asia, was of greater importance than the superficial north–south feature of the Urals.[93] In 1913, Supan argued that Eurasia was an integral whole permitting division only into sub-continents; he did not consider Russia as part of Europe but the "European peninsula" had no greater claim to be detached from Asia than had India.[94] A few other attempts were made to exclude Russia by taking her western frontier as Europe's limit[95] (Fig. 7E, line 1). But this was against the general opinion that Russia was now, at least in a restricted sense, part of Europe. In fact, at no time before or since was there greater agreement between the prevalent geographical, political, and cultural ideas of what constituted Europe than in the period preceding the Great War of 1914–18.

During this war, however, belief in Russia's successful assimilation was undermined by the fantastic career of the Siberian peasant Rasputin, and her place in cultural Europe was abruptly terminated by the 1917 Revolution. The westernized upper crust of court and aristocracy was destroyed in the explosion. There was now once more, as Schmitthenner puts it, "a culture-front between Europe and the Russian world," [96] while the historian Halecki writes:

> "Whatever we may think about the more or less European character of the Empire which lasted from Peter I to Nicholas II, the 'Red Tsardom' created in November 1917 . . . was and remained non-European if not anti-European." [97]

Furthermore, the political and administrative boundaries between Russia and her Asiatic empire, and the racial distinction which they implied, were dissolved, and the U.S.S.R. emerged as a unified division of Eurasia. The Urals ceased to be a dividing line. [98]

V

The two great wars of this century have destroyed European supremacy and weakened her cultural distinctiveness. After the First World War, Europe began to receive rather than emit cultural and political influences; large numbers of Europeans began to look to Hollywood or Moscow for their cultural or political inspiration. In a sense, Hitler's "New Order" was an attempt to reassert European supremacy in that it was opposed both to American and to Russian influences. But it was false to most of the ideals and traditions without which Europe was scarcely worth preserving. In the 1939–45 period, Europe suffered military invasion from both east and west and non-European forces entered almost every country. In most instances they are still there. This military and political catastrophe was followed by cultural disintegration and some have argued that Europe in the historical sense no longer exists.[99] The result of this has been to give renewed urgency to the question of the eastern boundary. Since the Russian revolution, and even more since 1945, historians, political scientists, students of international affairs and others have shown increasing interest in the problem. Generally speaking, they cannot accept the conventional Ural boundary of the geographers. Among the views of European scholars of renown, the following are typical. The Swiss historian Reynold, in his great work 'La formation de l'Europe' is definite on the question of Russia:

> "Russia does not belong to Europe, but to Asia . . . Russia is the geographical antithesis of Europe. This premise is fundamental: the Russia-Europe antithesis is found at every level." [100]

The Polish historian Halecki implies the same when he says that Europe is distinguished by its "extraordinary variety of particular regions within the narrow limits of that peninsula attached to the huge Asiatic continent. Whatever is colossal and uniform is definitely un-European." "A purely geographical" answer to the problem of Europe's extent

> "is obviously inadequate, and since it is equally obvious that the area included in the historical concept of the European community cannot be extended indefinitely into the plains of Northern Asia, the question arises whether the eastern frontier of that community ever did reach the Urals, whether it did not, in fact, remain west of it, as in Ptolemy's interpretation,"

and he adduces the Russian Slavophil tradition that Russia was not part of but opposed to Europe.[101] Sir Ernest Barker, after stating that Europe is a "horizontal

peninsula . . . an annexe or outcrop of the vast land mass of Asia," emphasizes the shifting, impermanent nature of its boundaries:

> "The line of its junction with the land mass is a shifting borderland which has wavered and oscillated in the course of history. At one time it is a line drawn far away to the east, along the Ural Mts and down to the Caspian Sea; at another it is a line pushed back towards the west, and running down from the east of the Baltic to the west coast of the Black Sea, or even still farther west."[102]

Toynbee is scathing in his reference to the orthodox Ural line of the geographers, speaking of them being reduced to

> "dissecting the living body politic of Russia into an imaginary 'Russia in Europe' and 'Russia in Asia' along the unconvincing line of the Ural river and the Ural Mts . . . thereafter the geographers belatedly discovered that the Ural Mts which they had made into a household word were not more noticeable a feature in the physical landscape than the Chiltern Hills, and that this vaunted physical barrier between Europe and Asia was not strongly enough pronounced even to serve as a boundary between one local province of the Russian Empire and another."[103]

In the post-war world the tendency is undoubtedly for all who treat of world affairs and European problems to think in terms of a small Europe. The College of Europe at Bruges considers Europe as that part of Eurasia west of the U.S.S.R.[104] A leading article in *The Observer* recently asserted that Russia was now "outside Europe altogether."[105] According to *The Economist*

> "there is now only a 'western' and an 'eastern' Europe and of these two, only what is called western Europe is habitually regarded in the West as European at all. The vision or the recollection of the large Europe that existed 50 years ago is left as a monopoly to the (fortunately few) advocates of reconquest. The rest of us have quickly got used to the idea of a very little Europe indeed."[106]

French and English-speaking geographers have generally accepted the Ural-Caspian line without demur; they may sometimes comment upon its arbitrariness, but more or less accept it as "traditional" or "conventional."[107] There are exceptions. Kish considers there is "ample reason" to prefer the western boundary of the Soviet Union, while Cressey emphatically rejects the Ural line; he concludes: "Even the crest of the Urals supplies no more of a boundary than the Appalachians. Would anyone divide the United States into two continents?"[108]

In contrast to this passive acceptance of a conventional line, vigorous controversy has continued elsewhere, especially in Germany. Coudenhove-Kalergi, trying in 1935 to discover how geographers limited Europe, circulated a questionnaire to leading European political geographers. Of 42 replies, most (14) were for the western frontier of the Soviet Union, and 12 for the Ural line; the rest chose other boundaries or declined to give a definite or unqualified reply.[109] Schmitthenner, whose attitude may have been coloured by Nazi ideology, distinguished the "real" Europe from Russia, but Kleist insists that Russia belongs to Europe.[110] In 1954 Louis introduced a new conception of Europe as a continent. According to him there is no "natural" or physical division between Europe and Asia; the separation must be made on grounds of human geography, particularly population density. He extends Europe into Siberia to include that eastward extension of population which, with the Urals as a base, has its apex in the vicinity of the Yenisei.[111] Otto Maull takes a similar view[112] (Fig. 5). But the rapid changes in the population dis-

tribution of Siberia consequent upon Soviet economic development make any such demographic idea of Europe as unsatisfactory as that which followed the shifting eastern boundary of Russia.

In the Soviet Union a final decision seems to have been reached, after much debate, to draw the boundary "along the eastern foot of the Urals, the Mugodzhar mountains, the Emba river, the north shore of the Caspian, the Kumo-Manych depression and the south coast of the Sea of Azov to the Kerch Straits." This places the whole Ural system in Europe, the Caucasus wholly in Asia.[113] As it is Soviet policy to appear

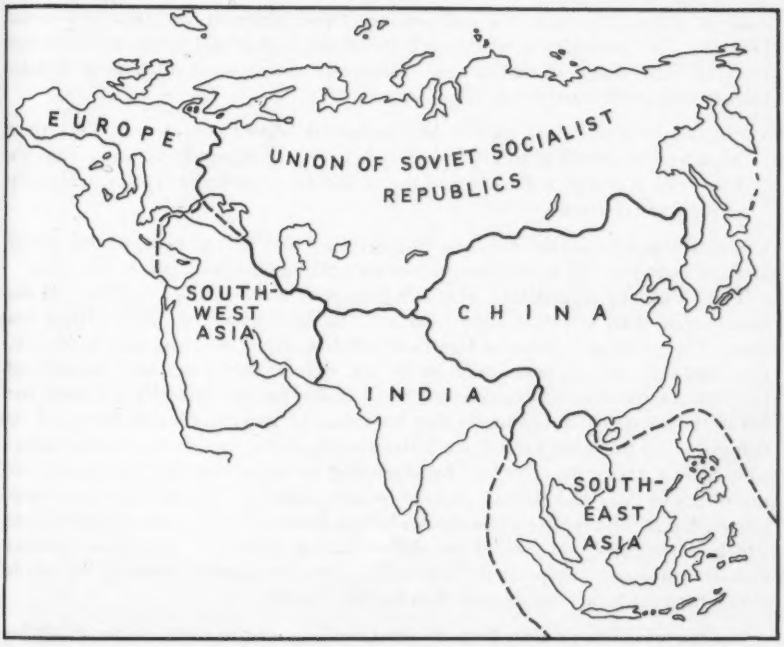

Fig. 6. Subdivisions of the Eurasian continent

European to the Europeans and Asian to the Asians, this is an advantage the Soviets cannot be expected to forgo.

The best solution to this problem of a division between Europe and Asia would seem to lie in discarding as outmoded the division of Eurasia into two very unequal parts along arbitrary and questionable lines, but rather to divide it into several subcontinents without violating the integrity of the Soviet Union (Fig. 6). Europe then becomes indisputably that part of the continent to the west of the U.S.S.R.[114] This interpretation is realistic in that it accords with what thinking people today mean by Europe, and it closely coincides with the historical and essentially geographical Europes. "For almost a thousand years Europe meant the community of western peoples who lived, broadly speaking, between Scandinavia and Sicily, the British Isles and the Pripet Marshes."[115] That is what it means again today.

It is no coincidence that "historical Europe" has its counterpart in a geographically distinct western extremity of Eurasia. To the west of the zone between the

Baltic and Black Seas, there lies an area with such an eventful geological history that its present structure is of unparalleled complexity and defies simplification. This involved anatomy of a complex of regions that have been so many times folded and faulted, warped and twisted, elevated and submerged, eroded and rejuvenated, as to present a lithological mosaic on the surface, is reflected in highly fragmented and individualistic relief as well as in the vegetative pattern. The great belts of vegetation and soils that stripe the other continents become unrecognizable in these western lands where soils and plant life reflect rather the rapid transition of local lithological, physiographical and human phenomena, than the broader climatic controls which determine the soil and vegetation zones of the great continents (Fig. 7F). The boundary or transition between the oceanic and continental climates lies also in this Baltic–Black Sea zone. Kendrew, who found it convenient climatically to include all Russia under Asia, wrote:

> "... at the Vistula the climate has become definitely continental. That river forms a convenient if arbitrary boundary between the relatively maritime climates of western and central Europe and the essentially continental type of practically all the Russian territory."[116]

Under Köppen's classification, the line dividing the "C" or humid mild-winter climates from the "D" or humid severe-winter climates likewise falls in this zone.

Thus it can be argued that, although Europe is not a distinct continent in the literal sense, there is a clear differentiation of the land west of the Baltic–Black Sea zone. The peculiar features of this land, its diversity of regions, variety of soils, favourable climate and penetration by the sea, were powerful factors in its material progress and the advance of its civilization. Possibly too, the diversity of Europe has led to those internal antagonisms that have drained its strength and destroyed its culture[117]; on the other hand, it made the western end of Eurasia more easily defensible against Asiatic invaders who had been able to sweep with little resistance over the plains of Asia and Russia. Europe became culturally distinct because it was geographically different.[118] The extension into Russia destroys that distinctiveness which is the only safe ground for differentiating Europe at all. When Samuel Purchas eulogized Europe at the beginning of the seventeenth century, his words would have made no sense if applied to Russia as well:

> "In Europe neither watery fens, nor unstable bogs, nor inland seas, nor unwholesome ayres, nor wild woods, with their wilder savage inhabitants, nor snow-covered hills, nor stiffling frosts, nor long long nights, nor craggy rocks, nor barren sands, nor any other effect of angry nature ... can prohibite all habitation and humane society."[119]

For Russia, to quote Elisée Reclus, is "half Asiatic in its extreme climate, in the landscape of its monotonous countryside and limitless steppes."[120] Likewise, when the modern French geographer Blanchard writes "In Europe all is variety ... Europe is a mosaic made up of countless cells," he is compelled to except Russia because it "weighs upon the continent with all its Asiatic mass."[121]

There are further arguments for differentiating Europe as a sub-continent of Eurasia along the western borders of the U.S.S.R. Such a solution removes Europe from its privileged position as a separate continent, recognizing that it is actually part—and a small part—of a coherent land mass; instead it places Europe on equal terms with South-west Asia, China and India as one of the sub-continents of Eurasia; this accords more with the modern world situation now that the political and cultural supremacy of Europe has departed. Although Russia is excluded from

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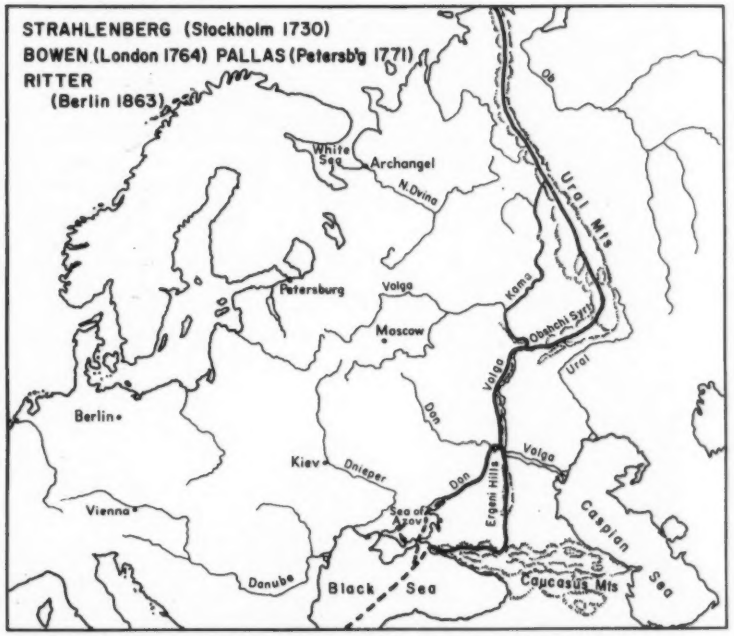
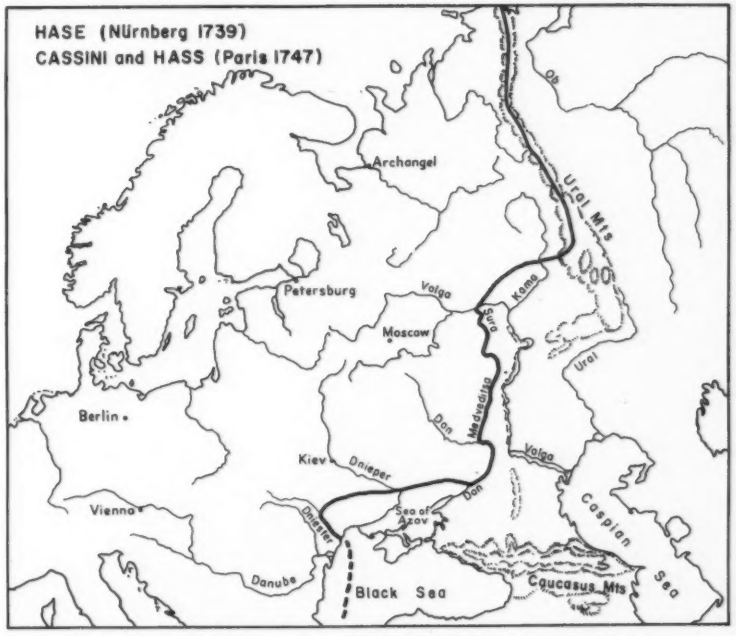
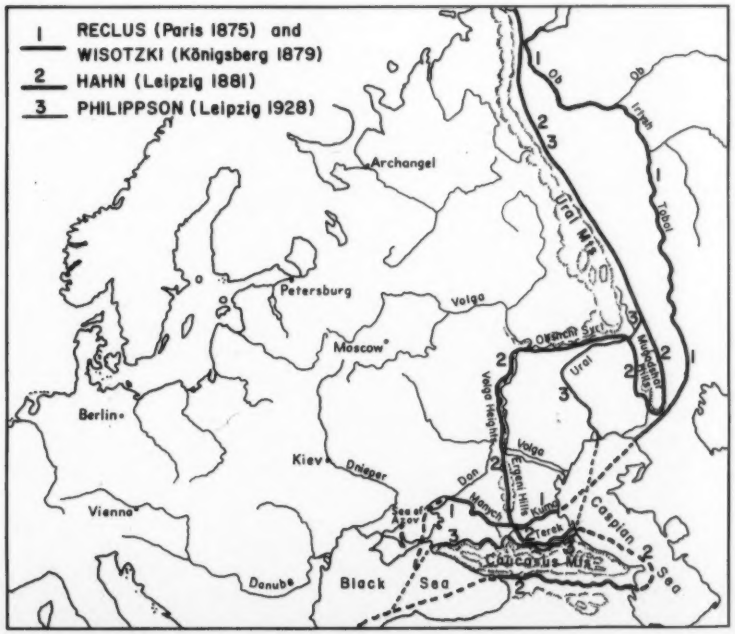
FIG. 7. SOME EIGHTEENTH, NINETEENTH AND TWENTIETH CENTURY BOUNDARIES OF



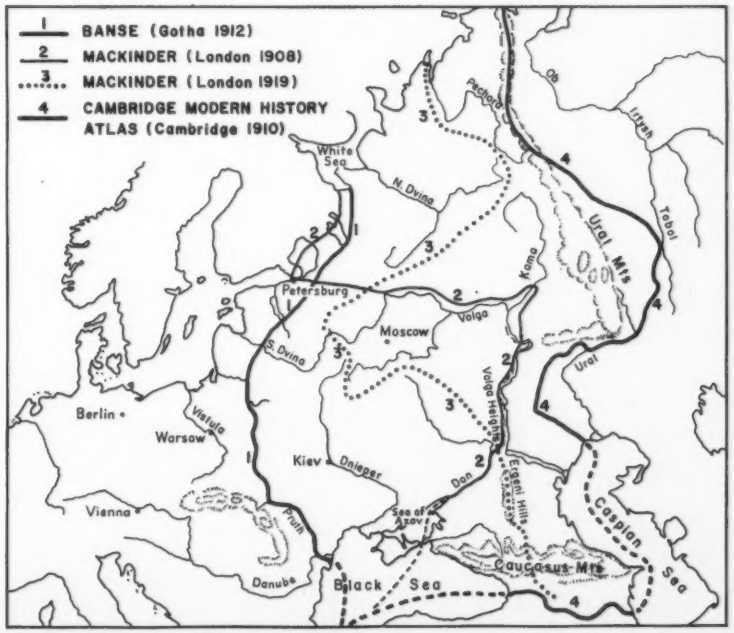
A. The Urals-Obshchi Syrt-Volga-Don/Ergeni Hills boundary and the Kama variant



B. An attempt at an ethnographic boundary between European Russia and Asiatic Tartary

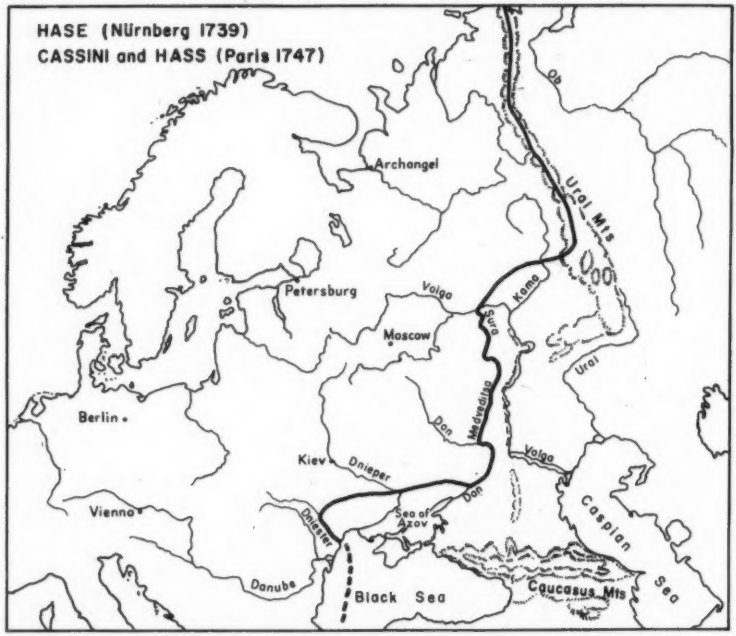


D. Boundaries drawn east of the Urals



E. Some early twentieth-century boundaries. Mackinder's 1919 line is his boundary between the Heartland and the European peninsula

EIGHTEENTH, NINETEENTH AND TWENTIETH CENTURY BOUNDARIES OF EU



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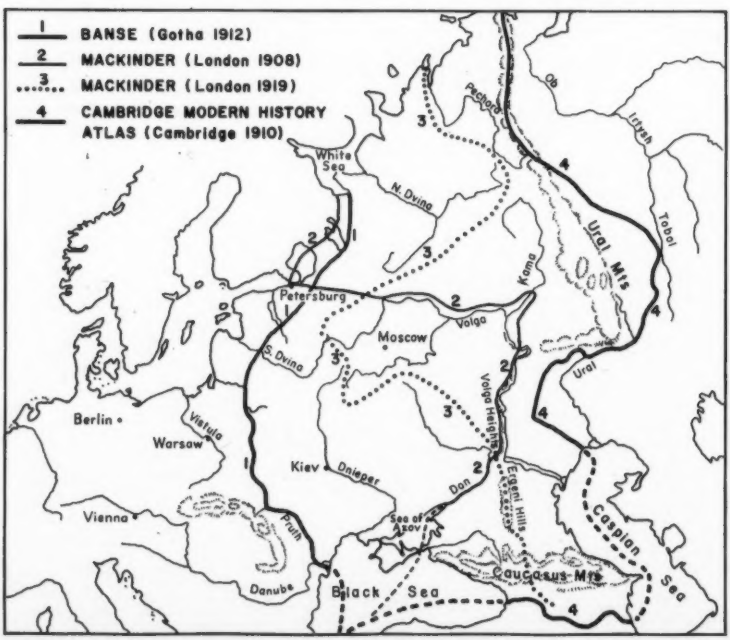

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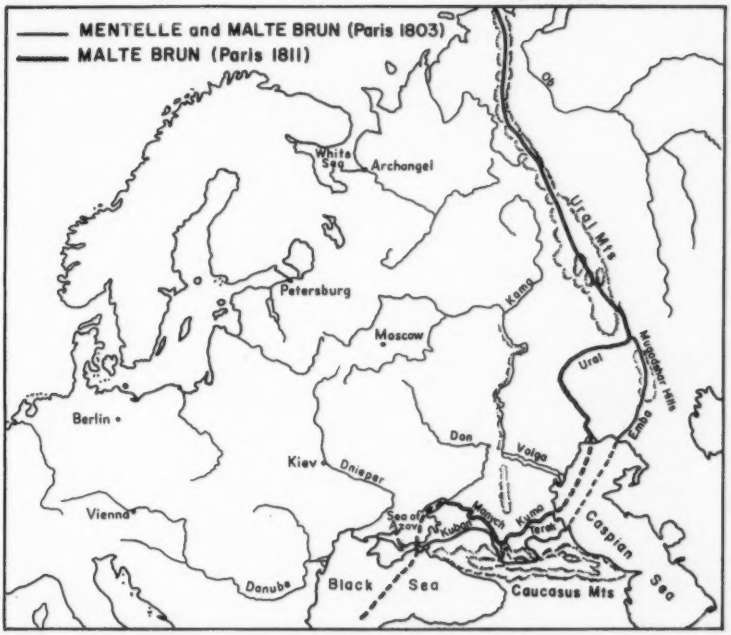
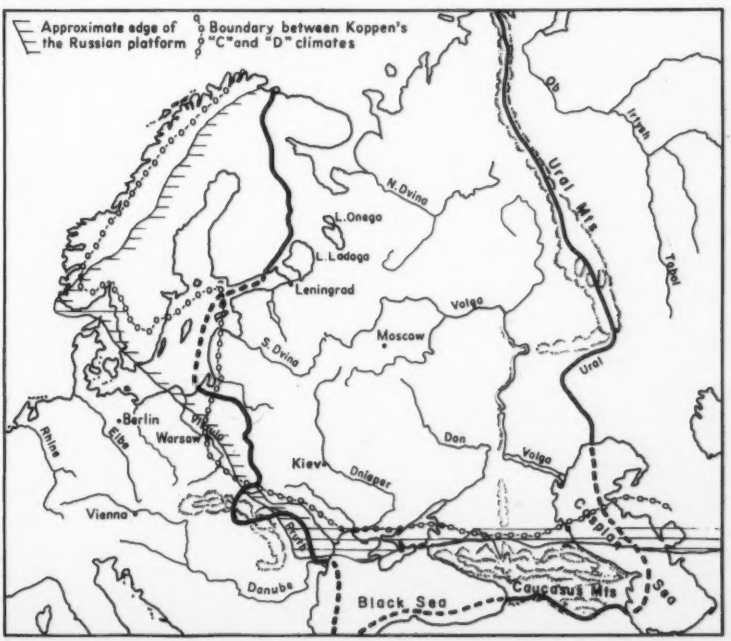


C. The Urals–Ural River and the Urals–Mugodshar Hills–Emba River boundaries



F. The western frontier of the Soviet Union and the conventional Ural boundary

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Europe, it is not thereby placed in Asia, but forms a sub-continent of its own. Geographers might welcome this suggestion on the grounds that it would be readily acceptable to scholars in other disciplines and to those concerned with current affairs. Their opinion of geography is not enhanced by being confronted either with the unthinking use of a quite unrealistic and indefensible division or else with a confused controversy. On more practical grounds, its general acceptance would free geographers from the obligation which they apparently feel today, to include part of the Soviet Union in their works on Europe.[122] Since Russia is dealt with more satisfactorily in works on the Soviet Union written presumably by those specially qualified in Soviet affairs and the Russian language, its treatment in works on Europe by writers unlikely to be Soviet specialists is superfluous if not ridiculous. Finally, map-makers, in order to include Russia's great area, are compelled to sacrifice much detail in Europe proper. General recognition of Europe as peninsular Eurasia to the west of the U.S.S.R. would allow a considerably larger scale to be used. A possible objection might be that the border between Russia and Poland-Romania is merely a political line and as such liable to change. It has certainly undergone considerable alteration in the first half of the twentieth century, but it has always lain in that Baltic–Black Sea zone which constitutes the geographical and historical frontier. Drastic changes in this boundary are unlikely without a major war, and their remote possibility need not stand in the way of its acceptance as a desirable and practical line along which to limit Europe.

Acknowledgement.—The author of this article gladly acknowledges the help he received from the staff of the British Museum Map Room.

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[2] Ritter suggested that Europe was the name given by the inhabitants of the high Caucasus (Kauk-Asos) to the plains north and west of them. See 'Vorlesungen über Europa,' Berlin, 1863, p. 47. Europe may be derived from the Greek *εὐρωπός*, meaning "broad-faced;" *c.f.* the derivation of Latium from *latus*, also meaning "broad."

[3] In the Homeric hymn to Apollo. See W. Smith, 'Dictionary of Greek and Roman geography,' London, 1878, p. 878.

[4] Herodotus, VII, 8. Aristotle also speaks of the Greeks as living between Europe and Asia: 'Politics,' VII, 7.

[5] Herodotus, IV, 46.

[6] Herodotus, IV, 45.

[7] See A. J. Toynbee, 'A study of history,' Vol. 8, pp. 708–11.

[8] Herodotus, IV, 42, where he says that Europe stretches alongside both Africa and Asia. He continued the boundary eastwards from the Caspian Sea by the River Araxes.

[9] Eratosthenes, Strabo and Ptolemy used the *Palus Maeotis–Tanais* boundary.

[10] According to Strabo, the Don flows between the Sea of Azov and the northern ocean; according to Ptolemy, it rises in the Hyperborei Montes, an alternative name for the Riphaean Mts.

[11] In Pliny this is the River Carambyce; on Ptolemy's map it is the Chersinus.

[12] As in the report of one-eyed men and griffins referred to by Herodotus, III, 116.

[13] See D. Hay, 'Europe, the emergence of an idea,' Edinburgh, 1957, p. 11.

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[16] William of Malmesbury, quoted by Hay, *op. cit.*, p. 31; Isidore of Seville (d. 636), 'Praeclarissimum Opus,' 1509 ed., p. iiii.

[17] This theme is developed at length by Hay, *op. cit.*, cap. 4.

[18] Hay, *op. cit.*, pp. 104–5, 120–3.

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[24] *Ibid.*, p. 147.

[25] Map of the world by Reisch, Fribourg, 1503, reproduced in Nordenskiold, 'Facsimile Atlas,' map xxxi; Vadianus J., 'Epitome Trium Terrae Partium,' world map, Zürich, 1534; 'Landtafeln,' Zürich, 1562, world map on title-page, dated 1546.

[26] Zurla, D. P., 'Il Mappamondo di Fra Mauro,' Venezia, 1806, p. 25 and map at end of book.

[27] Aeneas Sylvius (Pope Pius II), 'Asiae Europaeque Elegantissima Descriptio,' Paris, 1534, p. 494: "Europa dividitur ab Asia mari Aegaeo, Propontide, Ponto Euxino, Maeotide palude, Tanai fluvio, et hinc linea quae recta a fontibus Tanais ad septentrionem porrigitur;" Ortelius, 'Theatrum Orbis Terrarum,' Antwerp, 1570, text: "Tanai fluvio (vulgo Don) et Isthmo qui est ab eius fontibus, recta ad Septentrionem ab Asia dirimitur"; Hay is mistaken in giving Ortelius's maps of Europe as a reference for an Ob boundary, as on these maps the Ob is clearly shown to be in Asia; Purchas, 'His Pilgrimes,' 1613, in Hakluyt Society Extra Series, Vol. 1, 1905, p. 248; Brietius, 'Parallela Geographiae Veteris et Novae,' Paris, 1648, Vol. 1, p. 163.

Hahn's statement, in 'Zur Geschichte der Grenze zwischen Europa und Asien,' *Mitt. Ver. Erdk. Lpz.* (1881), p. 88, repeated by Hay, *op. cit.*, p. 123, that this line was held by the majority of geographers throughout the sixteenth and seventeenth centuries, is incorrect.

[28] Visscher, map entitled 'Nova Europae descriptio,' 1631.

[29] Robbe, 'Méthode pour apprendre facilement la géographie,' Paris, 1685, 2nd ed., p. 77: "le fleuve Don et par une ligne tirée de la courbure la plus orientale de ce fleuve au Golphe de la mer glaciale, qui est entre le détroit de Weigatz et l'embouchure du fleuve Oby"; Duval, 'The present state of the world,' 2nd ed., London, 1691, p. 197; L. Moreri, 'Le Grand Dictionnaire Historique,' Lyon, 1683, under "Europe": "Le Don ou le Tanais, duquel il faut tirer une ligne jusqu'au fleuve Obi, et jusqu'à l'Océan glacial."

[30] Moll, H., 'Atlas Geographus or a Compleat System of Geography Ancient and Modern,' London, 1711, Vol. 1, p. 119.

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[32] 'Cosmographie,' London, 1652, p. 32.

[33] On this point see Wisotzki, *op. cit.*, pp. 408–10.

[34] Clüver or Cluverius was born at Danzig in 1580 and became a renowned scholar of the University of Leiden; he made a special study of the ancient geographers. See J. Partsch, 'Philipp Clüver der Begründer der historischen Länderkunde,' *Geogr. Abh. Wien* 5 (1891) pp. 161–213.

[35] Cluverius, Philippus, 'Germaniae Antiquae libri tres,' Leiden, 1616, pp. 10–21.

[36] Baudrand, M. A., 'Dictionnaire Géographique et Historique,' Paris, 1705, under "Europe": "J'ai cru devoir suivre la plus commune opinion qui met les bornes de l'Europe à la rivière d'Oby."

[37] Moretus, B., revision of Ortelius, 'Theatrum Orbis Terrarum,' Antwerp, 1624: "Fines statuam ipsum Tanaim, Isthmum inter hunc et Rha fluvium, huiusque versus orientem divertigium, inde Oby fluvium, ad ostium hujus usque"; Baudrand, *op. cit.*, under "Europe"; Moreri, *op. cit.*, under "Europe"; E. Wells, 'A Treatise of Ancient and Present Geography,' Oxford, 1701, p. 17: "But the larger discoveries having since been made of those countries, the eastern boundary there seems now most naturally to be made up partly by the R. Don, partly by the R. Wolga, and partly by the River Oby"; H. Moll, 'A New Map of Europe,' London, 1708; A. Adam, 'A summary of geography and history,' 2nd ed., London, 1797.

[38] Clüver, *op. cit.*, p. 21: "Hac denique ratione omnis Russia Major . . . in una continetur Europa."

[39] Duval, *op. cit.*, p. 197.

[40] *E.g.* Valck, 'Europa,' Amsterdam, 1680; on this map the boundary runs from the north shore of the Caspian, between the mouths of the Volga and the Ural, north-eastwards towards the Ob mouth.

[41] Brietius, P., 'Parallela Geographiae Veteris et Novae,' Paris, 1648, pp. 162–3. This early seventeenth century political boundary using the Ural and Ob Rivers was mentioned by Clüver but rejected by him ('Germaniae Antiquae,' pp. 18–19).

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[43] 'A Prospect of the Most Famous Parts of the World,' London, 1668, pp. 42–3.

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[45] Lyon, 1560, p. 26.

[46] Merula, Paulus, 'Cosmographiae Generalis libre tres,' Amsterdam, 1605; Brietius, *op. cit.*, p. 163.

[47] Sanson, 'Cartes Générales de Toutes les Parties du Monde,' Paris, 1650, Map 3, "Asie."

[48] Ortelius, *op. cit.*; Mercator, map entitled 'Europa,' 1608.

[49] Herberstein, 'Rerum Moscovitarum,' Basel, 1551; Clüverius, 'Germaniae Antiquae libre tres,' pp. 11–16.

[50] An exception is the map of the world in 'Atlas Major, sive Cosmographia Universalis,' Vol. 1, Amsterdam, 1666, where the Urals are shown as a short range north of 60°N. but not named.

[51] Halecki, *op. cit.*, p. 98; Clark, G. N., 'The European inheritance,' Oxford, 1954, Vol. II, pp. 153–4.

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[62] *Ibid.*, p. 105.

[63] *Ibid.*, pp. 107–11

[64] *Ibid.*, p. 106. This is the official Soviet view—see 'Bolshaya Sovetskaya Entsiklopediya,' Moscow, 1956, Vol. 44, under "Ural."

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88 'Russischer Atlas: Mappa Generalis Totius Imperii Russici,' Petersburg, 1745.

89 Peschel, O. and O. Krümmel, 'Europäische Staatenkunde,' Leipzig, 1880, p. 5: "Die Ostgrenze Europas beruht nach alledem nicht auf natürlicher oder wissenschaftlicher Grundlage; sie wird durch einen Ukass des Kaisers Russlands bestimmt."

90 Lapie, Paris, 1829, quoted in Reynold, 'Qu'est-ce-que l'Europe?,' Fribourg, 1944, p. 50.

91 'Gilbert's Geography,' London, 1846, p. 26.

92 Suess, E., 'Das Antlitz der Erde,' Prague, 1885, Vol. 1, p. 768.

93 Mackinder, H., "The geographical pivot of history," *Geogr. J.* **23** (1904) pp. 424–31.

94 Supan, A., *op. cit.*, p. 689.

95 *E.g.* E. Banse, 'Geographie,' *Petermanns Geogr. Mitt.* **58** (1912) p. 3.

96 Schmitthenner, H., 'Lebensräume im Kampf der Kulturen,' Leipzig, 1938, pp. 21–2.

97 Halecki, *op. cit.*, p. 99.

98 *Ibid.*: "Now even the administrative boundary between the geographically European and Asiatic parts of Russia disappeared completely"; Holborn, *op. cit.*, p. 9: "The Urals are not a dividing line in modern Russia."

99 Holborn, *op. cit.*, p. x: "What is commonly called the 'historic Europe' is dead and beyond resurrection."

100 Reynolds, Gonzague de, 'La formation de l'Europe,' Vol. 6: 'Le monde Russe,' Paris, 1950, p. 25.

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102 Barker, E., 'The European inheritance,' Oxford, 1954, Vol. 3, p. 296.

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104 Kormoss, I., P. Dumont and J. A. Baltus, 'Orbis Terrarum Europae sub auspiciis Europae Collegii Brugis,' Bruges, 1953.

105 25 January, 1959.

106 28 February, 1959.

107 Shackleton, M. R., 'Europe,' 5th ed., London, 1954, p. 3; J. Gottmann, 'Geography of Europe,' New York, 1954, p. 8: "There is little use in changing the meaning of a geographical name, and there is no imperative reason to reconsider now the limits of the space traditionally called Europe"; A. G. Ogilvie, 'Europe and its borderlands,' London, 1957, p. xii: "The traditional eastern limit of Europe, the Ural Mountains and the Caspian depression, is adopted as acceptable for the purpose of this study despite the fact that it is now quite unrealistic in view of the political and economic organization of the USSR."

108 Cressey, G., 'Asia's lands and peoples,' 2nd ed., New York, 1951, p. 12; G. Kish, 'An introduction to world geography,' New York, 1956, p. 175.

109 Coudenhove-Kalergi, R. N., 'Wo liegt die Ostgrenze Europa's?' *Paneuropa*, Zürich-Wien, Dec. 1935, pp. 318–22.

110 Schmitthenner, *op. cit.*, p. 14 & map on p. 19; P. Kleist, "Europa endet nicht an der Elbe," *Z. Geopolit.* (Nov. 1951) pp. 661–6.

111 Louis, H., "Über den geographischen Begriff Europa," *Mitt. Geogr. Ges. Münch.* 39 (1954) pp. 73–92. He would divide this large Europe into two sub-continents, Eastern Europe

and Peninsular Europe, but the latter "ist damit nur ein Teil, wenn auch der bislang wichtigste Teil, eines wirklichen anthropogeographischen Gesamtkontinuums: Europa," p. 90.

[112] Maull, O., 'Politische Geographie,' Berlin, 1956, p. 20.

[113] *Central Asian Review*, No. 3, 1959, p. 274. I owe this reference to Prof. E. W. Gilbert.

[114] A Europe which divides politically into East and West. The idea of Central Europe would seem to have died in the War; cp. *The Economist*, 28 February 1959: "The term 'central Europe' has almost disappeared from the European vocabulary."

[115] Holborn, *op. cit.*, p. 3.

[116] Kendrew, W. G., 'The climates of the Continents,' 4th ed., Oxford, 1953, pp. 260–1.

[117] Halecki, *op. cit.*, p. 52.

[118] Reclus, *op. cit.*, p. 13: "C'est au milieu des îles, des péninsules, des vallées, des petits bassins, des horizons variés de l'Europe maritime et montagneuse; c'est dans cette nature si vive, si accidentée, aux contrastes si imprévus qu'est née la civilisation moderne, résultat d'innombrables civilisations locales, heureusement unies en un seul courant."

[119] Purchas, *op. cit.*, p. 248.

[120] Reclus, *op. cit.*, p. 13.

[121] Blanchard, R., 'La géographie de l'Europe,' Paris, 1936, pp. 1–2.

[122] Or even the whole Soviet Union, since the Urals are not a convincing boundary and the U.S.S.R. should not be split! This *reductio ad absurdum* is seen in V. Lefebvre, 'L'Europe et l'Asie Soviétique au milieu du XXme Siècle,' Brussels, 1956, and in Derruau, 'L'Europe,' Paris, 1958. In these works the whole Soviet Union is avowedly included because of the difficulty of making a division, and Lefebvre concludes that there would be little wisdom in dividing his book into two parts "sous prétexte que l'immense Russie s'étend de part et d'autre de l'Oural."

THE GEOGRAPHY AND ETHNICS OF INDIA'S NORTHERN FRONTIERS

SIR OLAF CAROE

I MUST BEGIN by disclaiming any authority as geographer, or ethnologist, or even as mountaineer or explorer. And since politics, at least in the narrower sense, are not the concern of this Society, let me say that I shall try to remain as collected as possible. It is of course impossible to deal with a question of disputed frontiers without reference to conflicting international claims and the facts of history, ethnics and geography on which these are based, and these facts I must in due course state. Perhaps it will be best to say that, where the talk touches on questions in dispute between nations, the approach is, as it were, on the diplomatic front. And that indeed is my warrant for speaking to you today. For nearly ten years I had the privilege of dealing with these frontiers before the transfer of power in 1947; since then one has tried to keep abreast of events, to understand new attitudes, and not to drop out of the race. In the course of those ten years one came to have a bird's-eye view of much of the ground all the way from the big bend of the Indus, where it encircles Nanga Parbat, to that of the Brahmaputra (Tsangpo, Dihang or Siang) in the deep trench enclosing Namcha Barwa in the far north-east.

Perhaps the best way to start is to remind you that all of us, since we were children, have been aware from the smallest scale maps that the Indian subcontinent, broadly speaking, is divided from the rest of Asia by the crest of the highest mountain range in the world, the Himalaya, and that to the north beyond the highest mountains lies Tibet. Whether Tibet was a part of China, or independent, we were never quite sure, but it was always marked large on the map. There were certain sections, no doubt, where this division was an over-simplification; in particular in the Kashmir region the frontier was advanced further, at least to the Karakoram, and there was the special case of Nepal, not a part of political India, even if its Government and people can claim to be proud upholders of the Indian way of life and, as it were, joint masters in the Himalayan world. It will be my purpose here to examine how far our early impressions were correct interpretations of history and geography, and how far current events are challenging them.

As I have said, Nepal is an independent State and not a part of India. It follows that it has, of course, been excluded from consideration in the vast correspondence that has passed between the governments of India and China in the last year on the subject of the frontiers. But, although not part of India, Nepal has always been in very special relations with the government ruling in India. In Nepal Hinduism and Buddhism meet—Buddha was born at Rummindei in Nepal—and Nepal is now in effect a Hindu State with a proportion of Buddhist subjects; it is a part of the Indian world. For a century and a half the Gurkhas of Nepal have supplied some of the crack troops of the armies of India. Indeed India must always be as much concerned over the integrity of Nepal as Britain has been over that of the Low Countries —perhaps even more so. For that reason, and because the Himalaya is Nepal's frontier also, it is impossible to exclude Nepal from any meaningful discussion of the geography and ethnics of India's northern frontier.

I have said that there have always been close ties between India and Nepal. But Nepal has had her relations with China also. In 1791 the Gurkhas of Nepal invaded

Tibet and sacked Shigatse and the Tashilunpo monastery, the seat of the Tashi (Panchen) Lama. Tibet appealed to China for help; the Manchu emperor, Chien-lung, sent it under a remarkable general named Fu Kang-an. The Chinese army, with large Tibetan contingents, performed the noteworthy feat of crossing the Himalaya by the Kyerong Pass and, after hard fighting, arrived at Nawakot in the upper Gandak Valley less than 20 miles from Katmandu. There peace was made in 1792, the Gurkhas (as later with the British in 1816) being anxious to make terms before the opponent could arrive in the valley of Nepal or take the capital. The price paid by Nepal was the surrender to Tibet of the regions around the two important passes Kyerong and Kuti, at the heads of the Gandak and Kosi rivers respectively, north-west and north-east of the Nepal Valley itself, and agreement to send every five years a delegation to Peking with tribute. This mission was continued until the fall of the Manchu dynasty in 1911, the last one being that of 1908. When the Manchus fell, the Nepalese Government, like that of the Dalai Lama in Tibet, regarded itself as in no way bound to the Republic that succeeded them. But, unlike Tibet, Nepal has not so far had to submit to the domination of the People's Government of China. There are, however, old Chinese maps in existence showing Nepal as part of China.

I have specially mentioned Kuti and Kyerong, for at these two points Nepal's frontier with Tibet, elsewhere generally along the crest of the main chain of the Himalaya, suffers an indentation, Tibetan territory coming well down the river valleys south of the watershed. In the Kyerong area the frontier is indeed as low as 6000 feet, and those who have read Harrer's book 'Seven years in Tibet' will remember his account of residence at the Tibetan village of Kyerong at a much lower altitude than is common in Tibet.

I mention these indentations here as important exceptions to the geographical principle which is the foundation for the Indian insistence that the Himalaya is the natural and inviolate frontier of the sub-continent. They are not the only ones, in either direction. As we are now dealing with indentations, mention should be made of the most important of all, that of the Chambi Valley, a wedge south of the main axis of the Himalaya thrust between Sikkim and Bhutan down the valley of the Amo Chu. This is part of Tibet and not included in India, Sikkim or Bhutan. Its importance is great, for through it runs the main line of communication between India and Lhasa, the capital of Tibet.

You will have observed that I have spoken hitherto of the Himalaya as a frontier between the Indian world (including Nepal) and Tibet, not between the Indian world and China. That has been for a purpose, to set the matter in historical perspective. In all diplomatic correspondence passing today between India and China you will find that Tibet as such has disappeared, and its place is taken by the phrase "the Tibet region of China." And the frontiers are now referred to as Sino-Indian, not Indo-Tibetan. And on a map published as recently as 1954 by the U.S.S.R. you will find it hard to trace any reference to Tibet at all; where in British maps we should expect to find *Tibet* written, its place is taken by *Kitai*, the Russian word for China. And incidentally, more particularly in the Ladakh and in the N.E.F.A. regions, this Russian map shows a frontier very different from that appearing in Indian or British maps of the same vintage—I shall revert to that point in due course.

But to understand all this aright, we must realize that until the People's Government of China conquered Tibet in 1950 and made an Agreement with Tibet in 1951, under which the Tibetans were forced to abrogate independence and admitted integration with China, Tibet had always enjoyed at least a *de facto*

independence. (It is true that by the 1951 Treaty China agreed to respect a limited Tibetan autonomy, but in practice even this undertaking was breached by China—a factor leading to the break in 1959.) China first occupied Lhasa in 1720, and did not then displace the local government conducted by the line of Dalai Lamas. Throughout almost the whole of the following two centuries Chinese authority was intermittent and at times non-existent. On occasion, and in particular as related in 1792 when the Chinese Emperor helped Lhasa to repel a Nepalese invasion, it was welcome to the Tibetans, and there was never any attempt to upset the Tibetan way of life. British authorities in India as far apart as Warren Hastings in 1774 and Curzon in 1904 found that Chinese rule in Lhasa was a fiction; Tibetans would use it as a screen to do nothing but would not carry out an engagement entered into by Peking on their behalf. It was Tibetan refusal even to answer letters and Chinese impotence to secure results that induced Curzon to despatch the Younghusband expedition to Lhasa in 1904. Subsequently the Manchus signalized their demise by a last expiring effort to establish a military occupation of Lhasa in 1908–10. A year later the Manchu Empire fell, the Chinese garrison at Lhasa had to surrender and was evacuated by India in 1912. From that date the Tibetans enjoyed at least factual independence and, like Nepal, claimed that all obligations to China had lapsed with the fall of the dynasty. This was the position until reassertion of Chinese authority by the People's Government in 1950.

The purpose of this recital is to show that throughout almost the whole of the era of British authority in India, from Warren Hastings until the emergence of an independent India in 1947, the substance of frontier questions to the north had to be negotiated with Tibet. China, in so far as she entered the scene, appeared as a sort of oracle or *deus ex machina*, some power not exactly in the background but up aloft. She had to be consulted of course, but as of duty bound, and practical results did not flow from consultation. There were in fact only two periods when Chinese authority in Lhasa was effective during the era of overlap between Manchu at Peking and Britain at Calcutta; these were when the Chinese crossed the Himalaya to ward off Nepal in 1792 and in 1908–10 when Chao Er-feng occupied Lhasa and the thirteenth Dalai Lama fled to India. It is not surprising that European maps at least marked Tibet, not China, as the trans-Himalayan state.

Every student of the frontier policies and actions of the British Government in India will be struck by the astonishing contrast between the continual turmoil with the Afghans and the Pathan tribes on the Sulaiman Mountains and the almost unbroken peace on the Himalaya. Such trouble as was caused on the Himalaya was attributable to Nepal and Bhutan, the intervening border states, and not to Tibet (China was never really in the picture). Nepal, once defeated in 1815, became a loyal ally; Bhutan, largely under Tibetan influence, gave up harassing tribal raids reminiscent of conditions round Peshawar and joined in the Indian system of defence. It was only on the Sikkim frontier that Lhasa declined to accede to an agreement made by Landsdowne's Government in 1890 with China and it was this that ultimately led to Younghusband's mission of 1904. Otherwise you will perhaps agree with Mr. Nehru when he said in a recent letter to Premier Chou on 16 November 1959: "This entire frontier was a peaceful one for a long time and there was no conflict or trouble there. It is only recently that conflicts and difficulties have arisen in regard to it. The cause of the recent troubles is action taken from your side." It is entirely true to say that before 1950 it was never necessary to deploy military force on any scale to guard the frontiers we are now considering, and that the relatively unbroken peace that reigned on the Himalaya, with a remarkable absence of incident or dispute, was largely due to the fact that over all these years

the Lhasa Government was peaceably inclined and had no ambition south of the mountains. The fact that such frontier settlements as had to be negotiated were with Lhasa and not with Peking will be clear from a more detailed study of the sectors involved.

Let us now examine the case in more detail (see Fig. 1, p. 302). The Tibetan, or now Chinese, frontier is a very long one, over 2000 miles, and it is convenient, looking from India, the south, to divide it into four sectors from west to east:

(i) The boundaries of the dependencies of Kashmir, *viz.*: Gilgit, Baltistan and Ladakh;
(ii) The Panjab, Himachal Pradesh and Uttar Pradesh boundaries. (This means what in our day we should have called Spiti, Simla Hill States and Garhwal-Kumaon in the U.P.);
(iii) Nepal, Sikkim and Bhutan;
(iv) The North-east Frontier (McMahon Line).

(i) *Kashmir frontiers.*—It is convenient for present purposes to divide this portion into two sectors, namely that facing north towards Sinkiang, and that facing east towards Tibet. Most of the northern frontier runs on the northern skirt of the Karakoram and thence along the Kuenlun. In so far as it skirts Sinkiang, it is partly now in Pakistan occupation from Gilgit and Skardu and, while the Chinese show part of that area as Chinese on their maps, they have not yet taken any action in it or raised the issue in practical form. I will therefore confine what is to be said to the portion which faces Tibet. All of this bulge is claimed by India as part of Ladakh. Ethnically Ladakh is Tibetan and Buddhist, unlike Gilgit and Baltistan which are Muslim. As anybody who has read Marco Pallis's book 'Peaks and Lamas' will know, it looks like Tibet, its people are of Tibetan habit and language, and it is full of Tibetan monasteries. But it has a long history of association with India.

The first point to remark in speaking of these Kashmir dependencies—not only Ladakh but Gilgit and Baltistan also—is that they are all north of the main axis of the Himalaya which here runs on the line of the Zoji La, thus supplying a major example of deviation from our general observation that the Himalaya is India's frontier. Indeed Gilgit and part of Baltistan extend even beyond the Karakoram, and Ladakh to the Kuenlun. For this there are historical reasons. It is in the Karakoram–High Tartary that Hindu thought places Mount Meru, "The navel of the world."

Ladakh seems first to have come under definite Indian suzerainty in the time of the Mughal Emperor Aurangzeb about 1690. Akbar had annexed Kashmir in 1586, but did not extend his authority north of the Himalaya; a century later there is record of tribute paid by the Ladakh Raja to the Mughal governor of Kashmir. When Mughal power disintegrated after Nadir Shah's capture of Delhi in 1739, Ahmad Shah, the founder of Afghanistan, was able to incorporate Kashmir in his new State in 1752, but his authority did not run as far as Ladakh and it was left to Ranjit Singh, the Sikh, to re-establish authority from India. He took Kashmir itself from the Afghans in 1819, and between 1834 and 1841 both Ladakh and Baltistan were conquered by his Dogra feudatory, Gulab Singh of Jammu, the ancestor of the Kashmir Maharajas. The general who did it was a cadet of the Dogra house named Zorawar Singh. Zorawar in 1841, proud of his victories, actually invaded Tibet, where he was defeated and killed. The Tibetans in their turn advanced to Leh, the capital of Ladakh, but were driven back, and the 1842 Treaty was the result. It is to be noted that all this took place before the British Government had defeated the Sikhs, or taken over the suzerainty of the Panjab or Kashmir (1846).

Fig. 1. India's northern frontiers. Based on Map 1 in 'Atlas of the northern frontier of India,' Ministry of External Affairs, Government of India, New Delhi, 1960

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The Treaty of 1842 referred to the frontier between Tibet and Ladakh as follows:

"We shall remain in possession of the limits of the boundaries of Ladakh and the neighbourhood subordinate to it in accordance with the old custom and there shall be no transgression and no interference beyond the old established frontiers. We shall hold to our own respective frontiers." This more or less repeats the words of an old 1684 treaty between Ladakh and Tibet speaking of "the boundaries fixed in the beginning." The 1842 Treaty was made between:

Sri Khalsaji Sahib (*i.e.* the Sikh ruler) and Sri Raja-i-Rajagan (Gulab Singh) of the one part and the Khagan (Emperor) of China and the Lama Guru Sahib of Lhasa of the other part.

The present Chinese Government have contended:

(*a*) that the then Peking Government did not participate in this treaty, and therefore that their successors are not bound by it, and

(*b*) that the frontiers were never delimited, and that in any case they did not include the big bulge, which was part of Sinkiang and not of Tibet.

The answer to (*a*) is that when in 1847 the matter was raised by the British as the new suzerain of Kashmir, the Chinese said that these borders had already been sufficiently fixed and the old arrangement should be adhered to. Moreover one of the signatories, Kalon Sokon, though by birth a Tibetan, had Chinese rank. The answer to (*b*) is that old Chinese maps themselves make it clear that Sinkiang was never conceived of as lying south of the Kuenlun.

There is, however, here another point of more general interest. The present Chinese Government state again and again that none of the frontier between India and "the Tibet region of China" has ever been *delimited*. It is not a gloss on their statements to say that they confuse delimitation (or delineation) in a description or a map with actual demarcation by pillars on the ground. It is true that, save on the Sikkim border and on a portion of the Garhwal border, there has never been any physical demarcation on the ground. This is partly because the frontiers were usually recognizable from description or tradition and, in many cases, traversed inaccessible chains of peaks many feet above the snow level or blizzard-swept uplands at 17,000 feet, such as those in Ladakh, and partly, no doubt, because the Tibetan authorities with very few exceptions accepted them and made no claims beyond them. But the absence of pillars in no way illegalizes a frontier well known by tradition, well marked by mountains or other natural features, or well described in a map.

In the Ladakh sector in particular Chinese maps themselves show that until recently the frontier followed the line shown in Indian maps, including in India the regions of Aksai Chin and Changchenmo now claimed by China. It is only in recent maps that the Chinese have altered these boundaries to support their occupation of the region through which the new road from Khotan has been built and where clashes with Indian patrols have taken place.

(ii) *The Panjab—U.P. Sector.*—This sector is sometimes referred to as "the Ari sector," Ari being a corruption of Ngari Khorsam, a Sanskrit name for South-west Tibet. This is the sector probably best known to most of our countrymen, for some of the snow mountains along which the frontier runs are visible from points close to Simla, and everyone who has spent a summer in Simla will remember the first miles along the Hindustan–Tibet road. This sector has two special geographical features: the first, that the main axis of the Himalaya is here cleft by the Sutlej; the second, that in many parts of it there is a double range of snow peaks, roughly parallel, with

the higher peaks mostly in the nearer India-ward range, but the lower range towards Tibet being the watershed. The first feature is notable in the Himalaya, for the main axis is cleft by the Indus and Brahmaputra at either end, and in between not only by the Sutlej, but by the upper waters of more than one tributary of the Ganges, notably the Karnali in Nepal which runs into the Gogra. But the Himalaya is not the only well-defined range cleft by rivers; others are the North and South Downs! Curiously enough, it is not along the paths cleft by these rivers that the main disputes lie; in this sector there is a claim by both sides to part of the upper valleys lying between the two ranges and to the passes over the lower (northern and watershed) range. The largest of these upper pastures between the ranges is the Nilang-Jadhang area, very close to the sources of the Ganges at Gangotri.

This Gangotri region under the Satopanth peaks is well described in Pallis's book already mentioned, and is, of course, among the holiest of all ground reverenced by the Hindu, visited yearly by thousands of devout pilgrims. Into Nilang-Jadhang, Barahoti, and other upper valleys there have been constant intrusions of Chinese patrols in recent years in a sector where Indian sentiment is very closely engaged. There has also been a paper battle about the ownership of six passes specified in Article IV of the 1954 Treaty between India and China—the so-called *Panchshila* Treaty; the treaty in which India, in addition to laying down five abstract principles for international behaviour, admitted that she regarded Tibet as an integral part of China.

These six passes are Shipki La, Mana, Niti, Kungri Bingri, Darma and Lipu Lekh and all are situated in this region. The Indian case is that the passes cross the watershed, the natural and traditional frontier and that shown in maps, and that their mention in the treaty, without any démarche to claim them as inside Tibet throughout their length, infers that the southern end is within India. The Chinese case is that the 1954 Treaty does not deal with frontiers explicitly at all—this is true —and that the people in the areas south of these passes are of Tibetan stock and shown by Tibetan records to have paid taxes to Lhasa.

We cannot here attempt to pursue detailed questions of this kind. But the Chinese claim that people who are ethnically Tibetan must be within China requires some attention. All along the Himalaya the Indian and Mongoloid stocks have met and mingled and in many areas are inextricably tangled. On the Chinese argument Ladakh, almost wholly Tibetan ethnically, would have to go to China. And, as we shall see, similar arguments could be applied to Sikkim and Bhutan. And who does not know the Mongoloid appearance of the Gurkha rifleman of Nepal? Apart from him there are thousands of people of Tibetan stock in the upper valleys of Nepal. Perhaps the best commentary on this argument is that it could be used to support a case for the cession of compact blocks of Liverpool and Glasgow to Ireland.

(iii) *Nepal, Sikkim and Bhutan.*—We have seen already the historical background to Nepal's relations with India and with China, and the reasons why at two points the frontier is indented and runs south of the main axis of the mountains. And we know too that the Premier of Nepal has recently brought back with him an agreement from Peking, whereby, we are told, he has secured an easy affirmation by China of the existing frontier. And only yesterday Premier Chou left Katmandu after paying a return visit. If the news is to be accepted at its face value, Nepal's case with China is going very differently from that of India. It is also true that, at least at the conference table, Burma also has seemed to secure from China an acceptance of that part of the McMahon Line lying in Burma, a contrast with the Chinese attitude towards India. Why should China apparently accept settlements with Nepal and Burma involving principles and practice which she strongly contests with India?

The answer may be that it remains to be seen how these arguments will be worked out. Much is left to a Joint Delimitation Committee in both cases—a device leaving ample scope for China to assert claims not previously acceptable to the other parties.

But, since this exchange of visits, there have been suggestions that after all everything is not to be so easy. At one time, though now it seems that reason has prevailed, apparently the Chinese claimed the whole of Everest. Now, Everest, as everyone here knows, can be approached from valleys to the north which drain via the Rongbuk Glaciers to Tibet, and from valleys to the south, which drain into Nepal. In other words it is not only the highest mountain; it is, unlike Kangchenjunga, also the watershed. Therefore a China which has apparently accepted the Himalaya crest as being generally the frontier with Nepal should logically claim only that part of Everest which drains to the Rongbuk Glaciers. But it seems that prestige, not logic, is the factor that counts. It is the same argument as that put forward for the whole length of the six passes in the so-called Ari sector. We shall all watch with interest what comes of the Boundary Commission, to which both governments have now agreed.

Sikkim, it seems, is the one region in which there is no disagreement between China and India. This is no doubt because in 1890, before we realized that in those days an agreement with China on a Tibetan question would be repudiated by Lhasa, Britain made a Convention with China in which the latter agreed that Sikkim would be a protectorate of India and included all waters flowing into the Teesta river. This China could scarcely repudiate now unless, like Afghanistan, she took the stance that treaties made with Britain were null and void. It is interesting that the Kangchenjunga massif, despite its immense height of over 28,000 feet, is not the watershed in this sector. The Teesta carries water from two valleys to the north of the great mountain, named Zemu and Lhonak, and the river issues round the eastern flank of Simvu and Siniolchu, the outliers of the massif to the east.

So here we have a case in which India can make good a claim to territory north of the main axis. The rulers of Sikkim are Tibetan by race, and those of the people (the Lepchas) who are not immigrants from Nepal are of a mountain race more Mongoloid than Indian in affinity. It follows that China here admits an exception to the ethnic principle she has sought to use in other sectors.

Bhutan is even more Tibetan in stock than Sikkim. It is not politically a part of India, but since 1910 has agreed to place its defence and foreign relations in India's hands, an agreement renewed by independent India after 1947. The Chinese have disclaimed on paper any claims over Bhutan, but their maps have shown a considerable segment of its eastern half as included in "the Tibet region of China" along with the areas claimed on the North-east Frontier south of the McMahon Line. To these we must now turn.

(iv) *The North-east Frontier* (McMahon Line).—It is in this sector that the most serious dispute lies. The disputed area is not far short of 40,000 square miles, about 400 miles long and 100 to 75 miles deep, about the size of England without Wales. Put simply, India claims—and holds—up to the main Himalayan axis; China claims a frontier along the skirts of the foothills where these merge into the plains of Assam only a few miles north of the Brahmaputra River. China's claim is in effect based on the border line of the British Province of Assam which showed the districts under regular administration. India's occupation—for it is much more than a claim—is based on the fact that the primitive tribes beyond the administered border—the Akas, Mönbas, Daflas, Miris, Abors and Mishmis—were for many years under British political control from a date early in the nineteenth century, and that the outer limit of India was clearly fixed on the Himalayan axis beyond these tribes at

the Tripartite Convention at Simla in 1914. India also states, and quite correctly, that these tribes have never been under Chinese or Tibetan control (with the exception of some monastic lands close to Tawang and then only with limitations) and have no affinity with China or Tibet. There are of course very many primitive tribes of this sort all over India, in Assam, Gondwana, Rajasthan, the Nilgiris and elsewhere.

The British line in the plains was a municipal, not an international line. In the earlier British maps, both on the North-west Frontier and here, it was customary in the early days to show India's borders as the line of administered territory. The tribal territory beyond was not part of any adjacent state. Sometimes it figured as white, sometimes as shaded in colour without an external limit. The fact is that it is only recently that the Western notion of fixed boundaries up to which an organized state administers on either side has begun to correspond with realities in Asia. Quasi-independent and unadministered territory continued to exist. Similarly in Arabia many boundaries remain to be fixed, notably those between Saudi Arabia and the coastal Sultans and Sheikhs. It was not till 1893 that the pressure of events made it incumbent on us to fix the Durand Line on the North-west Frontier to delimit the spheres of influence and control of the old India and of Afghanistan. And it was not until 1914 that a similar need was felt to fix a corresponding frontier, which has come to be known as the McMahon Line, as the limit between India and Tibet on the north-east. (At the time Burma was part of India, and a portion of the McMahon Line covers the northern frontier of Burma as far as the Isu Razi pass on the Irrawaddy-Salween watershed. China, as already stated, has accepted this portion as her frontier).

The McMahon Line, like the Durand Line, was named after the British India plenipotentiary who negotiated it, in each case the Viceroy's Foreign Secretary of the time. This was Sir Henry McMahon, subsequently High Commissioner in Egypt and the author of "the McMahon letters." So his name has given rise to more than one controversy. The line was shown clearly on two sets of maps, on the first set, attached to the convention as part of a red line designating the outer boundary of Tibet, and on the second again as a red line for official use in India.

It must now be said what happened at the convention as regards this frontier. (The frontiers were, of course, only one of many issues for settlement.) The three parties to the convention were China, Tibet and Britain for India; the plenipotentiaries, duly empowered and accepted by all, were respectively Mr. Ivan Chen, Lönchen Shatra and McMahon. China had specifically agreed to the attendance of Tibet as a fully empowered party to the conference. The plenipotentiaries agreed at Simla to all the terms of the convention, which included acceptance of the frontier of Tibet towards China and towards India (the red line on Fig. 2) and division of Tibet by a blue line (black on Fig. 2) into Outer Tibet, to be autonomous under the Dalai Lama, and Inner Tibet to be China-administered. All three plenipotentiaries signed the map in token of acceptance. You can see the signature of Mr. Ivan Chen, the Chinese plenipotentiary in the margin of this map, reproduced as Fig. 2 and facing p. 308, from 'Atlas of the northern frontiers of India,' New Delhi, 1960 (Map 23), by permission of the Government of India.

Then China repudiated her plenipotentiary's signature. But the only reason given was that China could not accept the boundary between China and Tibet; no demurrer was made in respect of that between Tibet and India. In face of the Chinese repudiation Britain then signed a bipartite convention direct with Tibet, and both plenipotentiaries signed and sealed another copy of the map in token of their acceptance of the India–Tibet frontier: see the signatures and seals at the top

of the map, here reproduced as Fig. 3 and facing p. 309, from the 'Atlas of the northern frontiers of India' (Map 24), by permission of the Government of India.

The Indian case for the McMahon Line frontier rests on the competence of Tibet as an international entity at the time to make such an agreement. And it is supported by the fact that, even though China repudiated her plenipotentiary's signature, she did not then, or indeed until 1958–9, take any formal exception to the McMahon Line. She objected only to the proposed drawing of the boundary between China proper and Tibet, the region where heavy fighting had been taking place and where the Khamba tribesmen live.

China now claims that the whole question of the frontier towards India was negotiated secretly behind her back. I am afraid this claim cannot be sustained, if only because the name of the Chinese plenipotentiary is clearly signed—you can see it—on the map of the Convention as having agreed to the boundaries there shown. So, going even further than this, Premier Chou has now stated in his letter of 26 December 1959 to Mr. Nehru that the part of the red line which faces India (now known as the McMahon Line) "was presented as the boundary between Tibet *and the rest of China*, and it was never stated that that part of the red line was the boundary between China and India." On this argument it seems that the Chinese Premier seeks to claim the disputed area between the Himalayan axis and the foothills as part of China proper—not even of Tibet. This argument India characterizes as "fantastic," and she has gone on to affirm that in 1914 Tibet was perfectly competent to negotiate a frontier with India.

China is on stronger ground in observing that many British maps, before and after 1914, showed India's frontier along the municipal line at the skirt of the foothills, and that British maps were not generally amended to designate a frontier according to the McMahon Line until some twenty years had passed. The reason for originally showing the municipal line I have already given, but it must be admitted that we left India with a quite unnecessarily difficult heritage by our failure to bring the maps promptly into consonance with international agreement. The failure was largely due to the outbreak of war in 1914 just after the Simla Convention, and the departure of McMahon himself to Egypt. The relevant volume of Aitchison's Treaties (recording British India's international agreements) was in fact not amended until the edition of 1929.

I should conclude the account of this sector by remarking that India is in possession all along the McMahon Line and has done much since 1947 to make Indian writ effective throughout this large and difficult region of mountain terrain. At one point only, Longju opposite Migyitün on the upper Subansiri, have the Chinese attacked and driven back an Indian post. It was through this territory, entering it at Kinzemane near Tawang, that the present Dalai Lama made his escape to India last year.

It is worth pointing again to the surprising contrast of attitudes whereby China has admitted the McMahon Line as her frontier with Burma but in the adjacent region of India not only declaims against its illegality but seeks to absorb what amounts to a whole province behind it. Yet the Burma frontier is nearer the heart of China proper than is that of India. What can be the reason for this inconsistency of treatment? Why does China single out India for claims covering tens of thousands of square miles, and at the same time seem to leave Burma and Nepal at rest? It has already been suggested that the differences of treatment may not be so clean-cut as appears on the surface. At any rate it does not seem that the answer has been vouchsafed in the course of Premier Chou's present visit to Delhi.

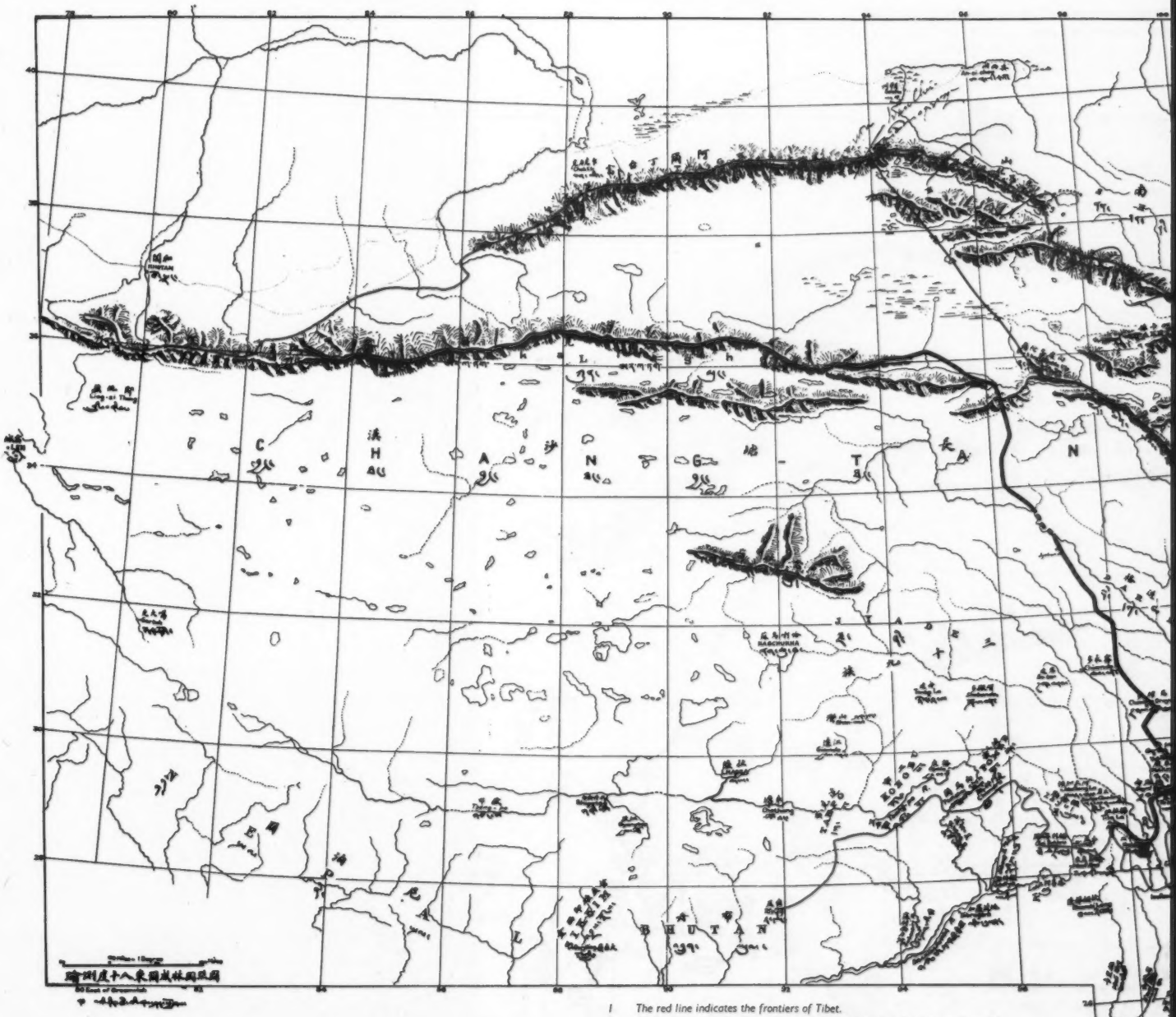
What is the sum of all this? Except in the far north around Kashmir, there is

warrant in history and treaty for the location of the northern frontiers of the subcontinent along the line of the high peaks of the Himalaya. Here and there are deviations to north or south of that line which represent events in history, but the rightness of the general assumption of the maps learned in childhood is clear enough. In the far north Indian control of Kashmir has led to the advance of her authority well beyond the Himalayan axis—which in this sector runs just north of the Vale of Kashmir on the Zoji La—up to, and in some cases just beyond, the Karakoram and up to the western sector of the Kuenlun, to embrace, in particular, Ladakh, a territory geographically and ethnically Tibetan. And while Ladakh is wholly Tibetan in race and scene, it should not be forgotten that the population along much of the rest of the Himalaya is of mingled Indian and Mongoloid strain, as is to be expected.

So long as China's authority in Tibet was nominal only—that is for some two centuries—there was remarkably little dispute about the limits of Indian and Tibetan allegiance. In the last few years the assumption by China of direct power in Tibet has raised formidable issues, mainly on the western and eastern segments of the frontier, in Ladakh and along what has come to be known as the McMahon Line. There is also a threat to the holy places at the sources of the Ganges. Along the eastern border of Ladakh there has been physical encroachment by China to the extent of some 12,000 square miles over a very lofty and almost uninhabitable tundra known as Aksai Chin, and south of it into the Changchenmo Valley. Along the McMahon Line, though there have been probing operations by Chinese forces, Chinese claims at present are limited to cartography and argument and India remains in possession. Premier Chou during his visit to Delhi this April has evidently not shown readiness to make a settlement with India on the lines already made with Burma and Nepal. The future is cloudy.

This story should end with a reminder of the place taken by the Himalaya in Indian minds. I do not think there can be any Englishman of sensitivity who has lived in northern India who is not conscious of the glory of the Himalaya, that great line of bright, inviolate peaks, symbolizing the beauty, the majesty, the spiritual aspiration and exaltation of all those who live within its reflected beams of light. And, if *we* feel that, how much more does the Indian look and long towards the hills that are the abode of the Gods? '*Ad te levavi oculos meos*, Unto thee lift I up mine eyes: O thou that dwellest in the heavens,' sings the Psalmist. It is Mr. Nehru himself who has spoken of the Himalaya as India's crown, and in a note on India's frontiers even his Ministry of External Affairs waxes lyrical: "The Himalayas have always dominated Indian life as they have dominated the Indian landscape. The stirring of the Indian spirit was directed towards these fastnesses, Shiva was the blue-necked, snow-crowned mountain God; Parvati was the spring-maiden, daughter of the Himalaya; Ganga was her elder sister; and Meru, Vishnu's mountain, was the pivot of the universe. The Himalayan shrines are still the goal of every Hindu pilgrim." And as our own poet has said:

> "Amen," quo' Jobson, "but where I mean to die
> Is neither rule nor calliper to judge the matter by,
> But Himalaya heavenward-heading, sheer and vast, sheer and vast,
> In a million summits bedding on the last world's past—
> A certain sacred mountain where the scented cedars climb,
> And—the feet of my Beloved hurrying back through Time."



1 The red line indicates the frontiers of Tibet.
2 The territory lying between the red and black lines is referred to as Inner Tibet.
3 The territory in which Lhasa is situated is referred to as Outer Tibet.

Fig. 2. Map to illustrate Article 9 of the Simla Convention, 1914, initialled by the British Representative and signed by the Chinese and Tibetan Representatives. The two latter did not merely initial the convention but signed it.

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CAROE

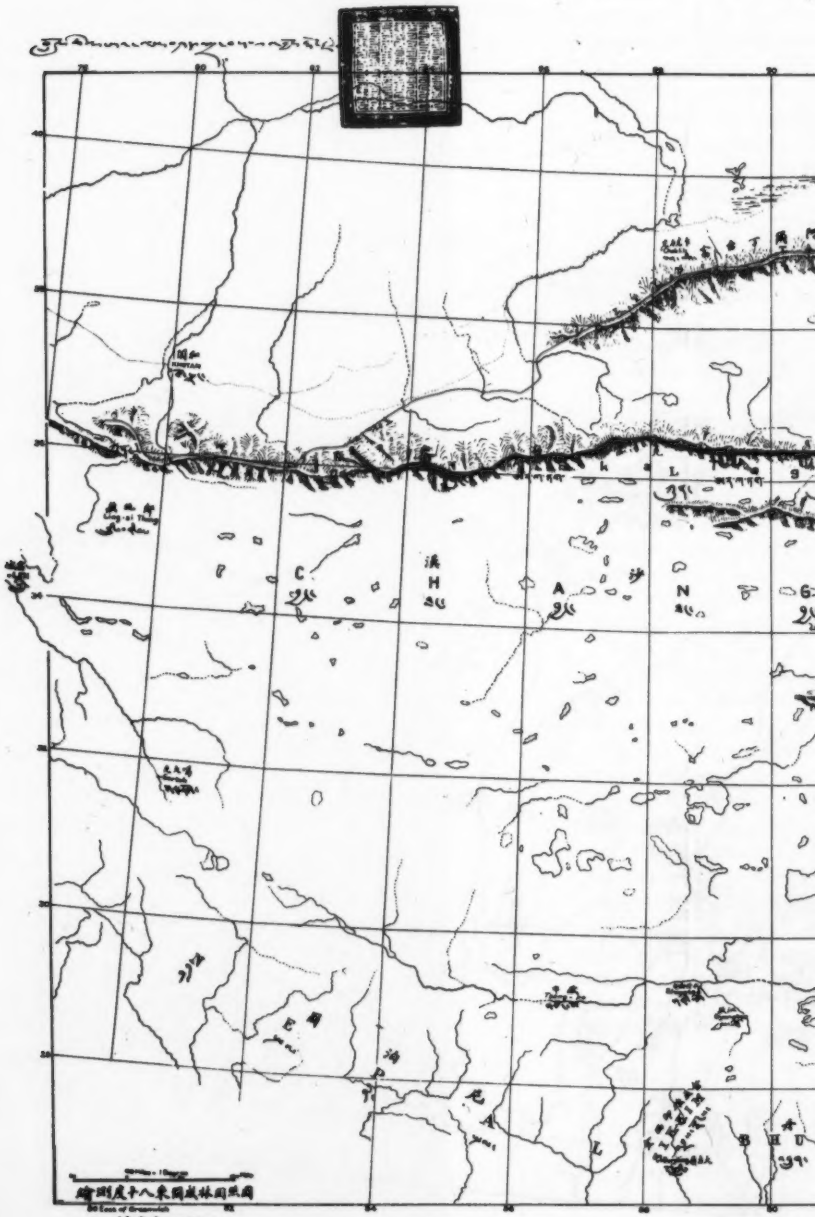
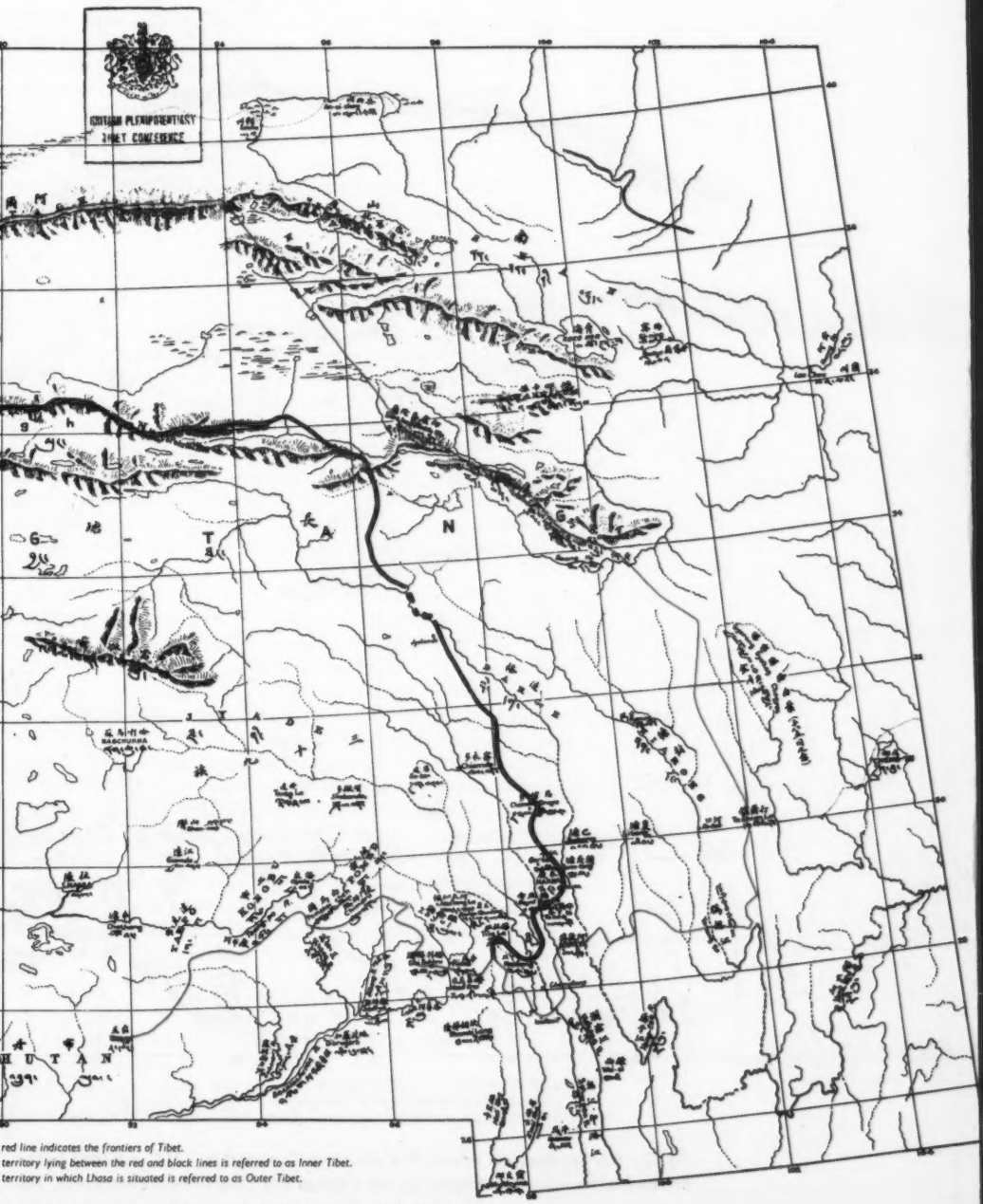

MAP REFERRED TO IN ARTICLE 9 OF THE CONVENTION BETWEEN GREAT BRITAIN, CHINA A
WE HEREBY SIGN AND SEAL IN TOKEN OF OUR ACCEPTANCE THIS 3RD DAY OF JUL
1 The red line
2 The territory
3 The territory

Fig. 3. Map attached to the Simla

HINA AND TIBET. DATED THE 5TH JULY 1914

F JULY 1914

Chinese Plenipotentiary
British Plenipotentiary.



red line indicates the frontiers of Tibet.
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territory in which Lhasa is situated is referred to as Outer Tibet.

e Simla Convention signed by Great Britain and Tibet on 3 July, 1914.

DISCUSSION

Evening Meeting, 2 May 1960

Before the paper the CHAIRMAN (Sir James Marshall-Cornwall) said: I would like to welcome most heartily the Society's guests, His Excellency the Ambassador of Nepal and Lord Birdwood. The subject of our lecture this evening is one of intense and perennial interest; it is of more particular interest at the moment because of the international rivalries which have recently arisen along the historic borderland of India.

Our Society has maintained a long and close association with the northern frontier of India. Many of our past Presidents have been actively engaged in either surveying, or demarcating, or consolidating, or administering that six-thousand-mile-long frontier. I need only mention three of them:—Lord Curzon, who became our President in 1911, Sir Thomas Holdich, who was elected President in 1917, and Sir Francis Younghusband who succeeded Holdich two years later. Lord Curzon, when Chancellor of Oxford University after he returned from India, gave a memorable lecture in the Sheldonian Theatre on the subject of frontiers. "Frontiers," he said, "are indeed the razor's edge, on which hang suspended the modern issues of war or peace, of life or death to nations."

Sir Thomas Holdich, who spent thirty-three years of his life in surveying the Indian frontier, described it as "The finest combination of boundary and barrier that exists in the world; never was such a God-given boundary set to such a vast, impressive and stupendous frontier." No man living is better acquainted with the problems presented by that "stupendous frontier" than our lecturer this evening. Sir Olaf Caroe entered the Indian Political Service forty-one years ago. In 1947, when British rule in India was handed over, he was Governor of the North-west Frontier Province. Throughout the whole of the Second World War he was Secretary of the External Affairs Department of the Government of India. We are looking forward anxiously to hear what Sir Olaf is allowed to tell us about that great frontier which he knows so well.

Sir Olaf Caroe then read his paper

The CHAIRMAN: I don't know whether you share my feelings, but I feel personally that I have just listened to one of the most fascinating lectures which I ever heard in this Hall. I would like in your name to thank Sir Olaf Caroe for the vivid geographical description which he has given us of this very pressing political problem. We have with us this evening Lord Birdwood, whose father was a very great soldier with a vast knowledge of India, which Lord Birdwood also shares.

Lord BIRDWOOD: While I have been listening to Sir Olaf I have naturally been calling to mind some of my own experiences with this Himalayan barrier. In the west, I can remember climbing up to the top of the Safed Koh, and in those days, of course, there was no indication of a frontier when one got to the top. The watershed was regarded as sufficient. I do recall, I think, that there is a critical point somewhere near Simla; it came to me when Sir Olaf was talking about that critical area where three countries meet, where, if you throw a bit of paper on one side of the ridge, it would find its way down by the Indus to Karachi, and if you should throw it the other side of the ridge, it would find its way into the Bay of Bengal. I am not sure whether this is strictly accurate! I was particularly interested in the analogy between the Durand Line and the McMahon Line, because if you have served on the North-west Frontier as I have, one does understand the nature of that problem of the no-man's-land; and it was fascinating to me to hear of the same conditions reproduced over in the east. I did feel that the lesson, perhaps, for us is the need for precision when we lay down boundaries, and can quite understand how, in those *laissez-faire* days, with no political problems ahead, we were all content just to leave it undefined, as it was on those maps which we have just seen. One forgets that Governments fall and new Governments arise, and different ideas, and one regrets today, perhaps, that one was not a little bit more precise.

A HYDROGRAPHIC SURVEY UNIT IN BRITISH ANTARCTICA

C. J. C. WYNNE-EDWARDS

ONE OF THE more outstanding features of Antarctic exploration and Antarctic science since the war, a feature which by nature of its routine progress has often been overlooked, has been the expansion and consolidation of the Falkland Islands Dependencies Survey. There is little need, however, for me to dwell on the achievements of this organization tonight; others have already outlined to you in detail the many and various contributions of the Falkland Islands Dependencies Survey towards man's knowledge of Antarctica.

With the steady expansion of the Dependencies Survey, from its initial three stations in 1945 to eleven in 1958, new problems have arisen. First and foremost, perhaps, has been the logistic necessity to establish, and keep supplied on a regular routine, each station in the Dependencies. With rapid expansion in little-known territory, this has not always been easy; the ships attached to the Dependencies Survey as part of their regular relief programme have had to move for much of their time in little surveyed, and often completely uncharted, waters. As in all unfrequented areas, the history of hydrographic survey in Graham Land extends over many years; although large stretches of coastline were known to the early whalers in the latter part of the nineteenth century, it was not until Dr. Charcot's two expeditions of 1903 and 1908 [1] that maps and charts of the west coast began to take a definite form. The voyages of R.R.S. *Discovery* in 1929 [2] greatly added to these early surveys, and the British Graham Land Expedition [3] of 1934–7 contributed more precise detail to much of the coast.

After the war, Royal Naval hydrographic units were employed in west Graham Land, based aboard the Royal Research Ships supplying the stations. The efforts of Commander D. N. Penfold D.S.C. and Commander F. W. Hunt M.B.E., between the years 1948 and 1952,[4] resulted in the production of the first surveys based on the use of modern hydrographic instruments, and many harbours and anchorages along the west Graham Land coast and off-lying islands were examined in detail. The advent of the International Geophysical Year and the further expansion of F.I.D.S. stations again gave an urgency for further hydrographic survey work in this area; and accordingly a small expedition was formed in England in July 1956 to travel south to Graham Land aboard H.M.S. *Protector*, the Royal Naval Antarctic Guard Ship for the Dependencies, to be landed and to work as an independent unit based ashore. The original expedition of six which formed this unit consisted of an R.N. surveying officer in charge, two seamen surveying recorders, two seamen for general duties and an engineer-mechanic; the whole party was under the aegis of the Hydrographer of the Navy. Members of the 1956/1957 and 1957/1958 parties are listed in the appendix, p. 316. Although shore-based, the party was to have complete mobility, using a specially converted survey motor-boat of modern design, twenty-nine feet long, and adapted for use in ice conditions. The unit was intended to be completely self-supporting and as mobile as possible. The very nature of our task demanded that we should be in no way reliant on one particular base; and with this in view a special prefabricated hut, easily assembled in handy-sized panels, was manufactured in England. It would therefore be possible as the survey progressed down the coast to move house whenever convenient. Special rations were devised, taking into account the existing scale of rations used at F.I.D.S. stations, and bearing in mind the need for easy handling and preparation aboard a small boat.

H.M.S. *Protector* reached Port Stanley on the 4 November 1956 and, after discussions with H.E. the Governor and with officials of the Dependencies Survey, it was

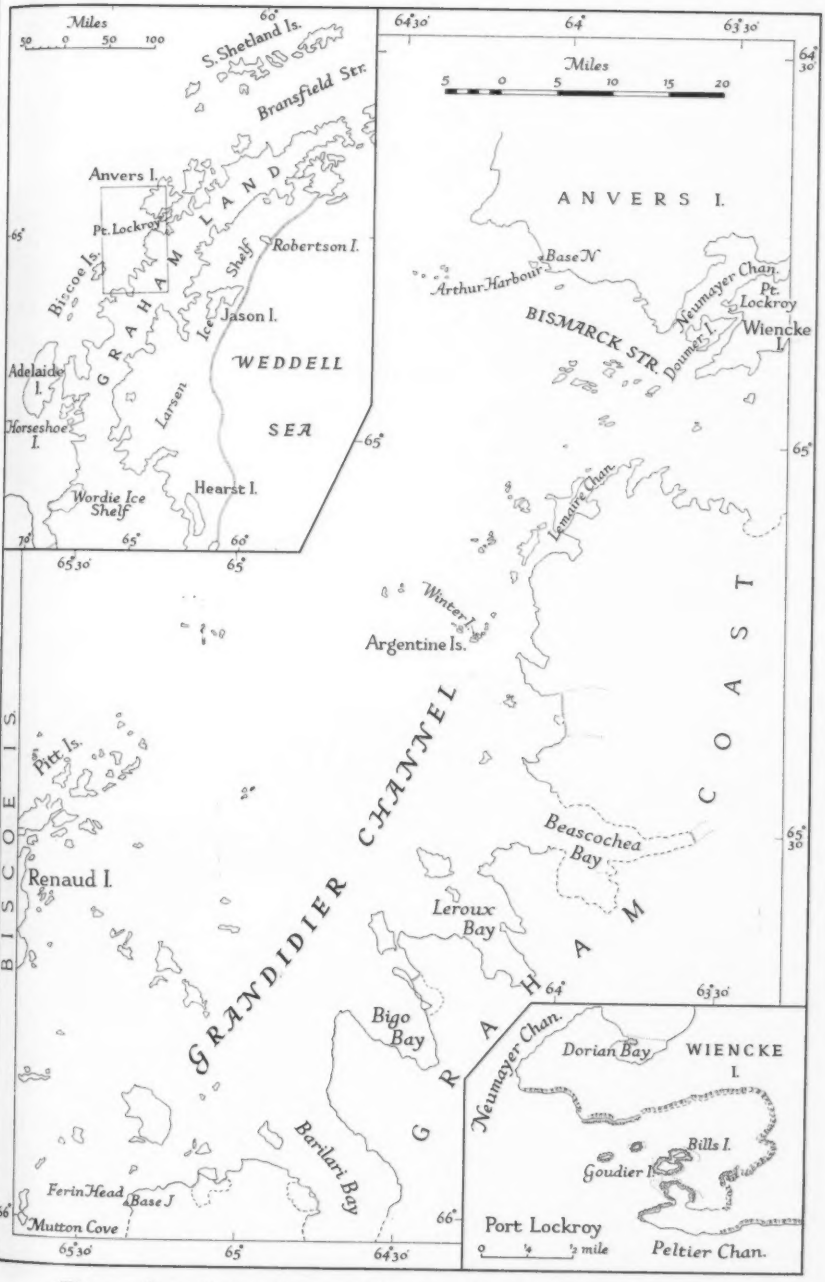

Fig. 1. Area of operations, west Graham Land (inset: Port Lockroy)

Motor survey boat
sed by the Royal
Navy's Hydro-
raphic Survey Ex-
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the coast of

decided to land the expedition at Port Lockroy and to begin a survey of the Bismarck Strait area to the southward. The importance of this particular strait can be easily assessed by referring to any map or chart of west Graham Land (see Fig. 1). The main shipping-lane up and down the coast lies inshore, providing access to the Dependencies Survey stations established along the coast. This route, although not accurately defined in many places, follows a reasonably well known and clearly defined coastline along which it is possible to navigate visually, whereas offshore a series of nearly unknown, and often ill-defined, offshore islands makes navigation extremely hazardous. Bismarck Strait provides an exit from inshore to seaward, and is also a junction between Neumayer and Lemaire Channels on the inshore route. In 1956 it represented also the furthest south of any reasonably accurate triangulation linked with previous hydrographic survey work.

Protector reached Port Lockroy on 11 November 1956 and the expedition's stores, hut and boat were landed on that day. We were indeed fortunate to be landed so early in the season, and the ice conditions throughout the 1956–57 season could not have been better for our purpose. One of the problems of operating a small boat independently along the mountainous coast of west Graham Land is the difficulty of finding secure anchorages and harbours which will give protection both against the weather and against drifting ice. Port Lockroy has a tiny deep-water harbour where it is possible to lay a mooring and, with the small tidal range of five feet, to achieve a snug, safe berth (see Fig. 1). A comparatively narrow and shallow entrance to this harbour keeps out all large pieces of floating ice which could endanger a boat. During the subsequent two years' work along this coast the safe sheltering of our motor-boat became the most important consideration during our journeyings; it was more essential than anything else to find a safe haven when the time came to choose a camp site for the night. Floating ice was the ever-present bugbear; if no completely safe site could be found, a watchkeeper was kept aboard all night.

I have spoken briefly about our transport, but its great contribution to our work warrants a more detailed description.[5] The basic design was that of the latest type of survey motor-boat carried by Royal Naval surveying ships. The boat's layout was essentially compact, allowing full mobility and maximum efficiency when echo-sounding—its primary task. The after-cabin carried the echo-sounder and plotting table, together with surveying instruments, radio set, and any other associated gear required. The engine amidships was a Perkins P4M marine diesel with electrical starting and a closed-circuit water-cooling system. A compartment forward carried a small galley stove and the heavier items of survey equipment which might be needed. These three enclosed compartments could also provide sleeping room for up to six people when necessary.

The boat was controlled from the stern by an ingenious device known as "Kitchen" gear. This consists of a pair of moveable metal shields on either side of the propeller pivoted together centrally; these shields take the place of an orthodox rudder and are opened and closed to alter the flow of water around the propeller and thus to regulate the boat's speed. When angled, the shields act as a rudder to steer the boat. This gear thus gives great manœuvrability, a turn through 180° in its own length being quite feasible, and the advantage of this when moving through narrow ice leads is obvious. For working in ice a protective belt of copper sheathing overlaying greenheart wood was added over the existing double diagonal carvel ash planking.

Surveying operations began very soon after the expedition had landed. In the Port Lockroy area an earlier subtense base line had been measured some years previously; with this as a starting point, a triangulation scheme was expanded from the area south-westward towards the Bismarck Strait. The problems of terrain with which we were faced when extending or establishing a triangulation scheme were in many ways similar to those with which the F.I.D.S. surveyors had already become familiar. Accessibility of stations where landing points were few and far between became a primary consideration; we had, however, the invaluable advantage of a well found boat in which to move along the coastline rapidly and securely. The problems

connected with the actual siting of the stations were more critical for, with the boat sounding which follows triangulation in a hydrographic survey, it is mandatory to be able to see at least a proportion of one's primary triangulation stations.

Almost immediately, we ran into substantial difficulties of terrain south of Port Lockroy. High mountains come right down to the sea, terminating usually in inaccessible ice cliffs, and this put paid to any normal scheme. It became necessary to build up a complex polygon figure around a centre triangulation station located on the top of Doumer Island. Our stations were marked by poles of various sizes, usually about twenty feet long, and all carrying a conspicuous flag. For exceptionally long rays, a number of bamboos had been brought; but although these were excellent visually, with their 40 odd feet of length, they were unwieldly in transport, especially on mountain sides, and needed care in erection.

We were blessed during the early Antarctic summer of November and December 1956 by particularly good weather. Little wind, and ten days of cloudless skies, gave us a real bonus and with twenty-four hours of daylight, rapid progress was made with the triangulation. Most fortunately, too, we had come south for one of the best of ice years known, and were virtually untroubled by this hazard during our first season.

H.M.Y. *Britannia*, with H.R.H. the Duke of Edinburgh aboard, paid a visit to Port Lockroy in early January 1957, and for this visit we extended the existing chart plan of Port Lockroy harbour to cover the outer approaches. Hitherto, large ships had been prevented from entering the small enclosed inner harbour, and had also been unable to anchor in the deep offshore approaches. A thorough examination, however, revealed two possible anchorages, as well as marking a pinnacle rock in the middle of Neumayer Channel rising out of 250 fathoms to within 21 feet of the surface. As the Bismarck Strait survey moved further afield, it became necessary to move headquarters to the F.I.D.S. station at Arthur Harbour on the south coast of Anvers Island. A substantial triangulation scheme had already been built up and expanded by the land surveyors from here during the two previous years, and our own triangulation was joined in with the chain of stations already established. Triangulation was virtually completed in late January; boat sounding began in ice-free waters, and was finished in mid-February without incident.

Much of the coastline was laid down by analysis of air photographs from the then current Falkland Islands and Dependencies Aerial Survey Expedition. Our control points were established on these photographs, and the subsequent details obtained by photogrammetrical methods. In cases of possibly dubious interpretation on these later analyses (*e.g.* small off-lying islands which from the air could be easily confused with ice, but were identifiable from ground level) the coastline was walked over and fixed visually. Similarly, off-lying reefs and rocks were positioned by definite fixing. The area having been completed in mid-February, an attempt was made to circumnavigate Anvers Island, with the particular intention of mapping some of its practically unknown west coast. The voyage was achieved, but visibility was too poor most of the way to obtain any surveying results.

H.M.S. *Protector* visited Port Lockroy in late February to re-embark the boat and some of the expedition; I myself joined *John Biscoe* with one surveying recorder, in order to reconnoitre further southward down the Graham Land coast, and also to carry out any small harbour surveys which might be achieved in the few days available at each station. Two small surveys were completed during this trip, one at the new station at Ferin Head, and the other at the F.I.D.S. station on Horseshoe Island.

The English summer of 1957 was a busy one. Work went ahead concurrently writing up and drawing the previous season's survey, and also laying plans for the forthcoming Antarctic summer season. Lessons we had learnt in methods of survey, and the experimental stores and clothing we had used, were analysed; and the resulting improvements applied to the second season's programme. Conferences were held to discuss the next area to be surveyed and it was unanimously agreed that Grandidier Channel, some forty miles south of Bismarck Strait, should be attempted (see Fig. 1). A survey of this area, rather larger than that of the previous season,

would continue the survey southwards, and would also provide coverage of a sixty-mile-long area between the F.I.D.S. station on the Argentine Islands and the newly established one at Ferin Head; a very sketchily covered stretch of coastline and water from the hydrographic point of view. The area was an important one for the land surveyor also, for little triangulation had been carried out to give control to the recently completed aerial survey. The land surveyors had moved north from the F.I.D.S. station at Ferin Head during the previous winter for a distance of about twenty miles; between this and our previous season's triangulation lay an area with virtually no control. To cover this area during the short season when the sea would be reasonably clear of ice, the expedition needed to have greater mobility than in its first year. For this reason, therefore, no fixed base was planned, although provision was made for the possibility of a base camp in the Argentine Islands area during the earlier stages of the survey. From there, we intended to establish camps up and down the coast as necessary.

The expedition sailed from Southampton aboard R.R.S. *John Biscoe* on 21 October 1957, and after some inevitable delays arrived off the Argentine Islands on New Year's Day 1958. As *John Biscoe* progressed further southward, it became apparent that ice conditions were very much worse than in the previous season. In the approaches to the Islands themselves, there was a covering of 10/10ths brash ice. Looking southward from the Argentine Islands where we unloaded our stores and equipment, to the area which we were to survey, only a few patches of open water were showing, while further to the west an unbroken line of pack ice and icebergs lined the horizon. For a temporary home in the Argentine Islands, we reoccupied the old hut on Winter Island, disused since F.I.D.S. had built a newer and bigger station on the next island. Although ramshackle it very soon proved to be habitable and once the snow had been cleared from the rooms, it became dry and warm. It was comforting to know that we were starting operations from exactly the same site as the British Graham Land Expedition, twenty-two years previously. To enable other scientific work to be carried on while survey work was in progress we had, in addition to the first year's team, the most welcome support of a number of F.I.D.S. personnel who joined the expedition for the summer season. These numbered five in all: a doctor, a wireless operator, a geologist and two land surveyors. In addition, a palaeomagnetist worked with the expedition for three weeks early in the season (see appendix, p. 316). The geologist and two land surveyors had been based at Ferin Head, at the southern end of our survey area, during the previous winter.

Working jointly with this greatly increased potential we hoped to put three or even four separate units into the field at the same time. Our first disappointment came when the *John Biscoe* returned northward to the Argentine Islands, having failed to reach Ferin Head because of heavy ice conditions. She reported consolidated field ice ten miles south of us with no leads, and this was a discouraging forecast for our party in its twenty-nine foot boat. In the meantime, a start was made by establishing a base line extended from Hunter Short Base equipment placed between two small rock islets in the Argentine Islands. This completed, the motor-boat moved out to do battle with the ice. The first season had been uneventful in this respect; the second started very differently. Operating often during the first month in 8/10ths broken pack ice, progress with the motor-boat was desperately slow, and trips between triangulation stations three or four miles apart often took three-quarters of a day. Provided the boat had a little manœuvring space, it was usually possible to keep moving ahead, but as soon as ice started to exert any movement or pressure, progress was halted. On her third attempt in mid-January 1958, R.R.S. *John Biscoe* reached Ferin Head, and the next day returned to our base with the three remaining members who were to make up our expedition. Gradually, ice conditions improved and the triangulation framework was extended slowly southward. Where possible, with this already established, sounding was carried out on passage.

The normal method of fixing the positions of soundings is to measure with a sextant the angles subtended at the boat's position by three known control points. These

three points must not lie on the same circle as the boat. In our case it became necessary on occasion to use points which had not yet been established, and to plot the sounding fixes later when the control had been completed. It is also usual practice in hydrographic surveying to cover an area by steaming up and down in straight lines; the vessel is fixed at intervals along these lines, and the soundings between the fixes are supplied by the recording echo trace. In heavy ice, however, this was clearly impossible, and it became necessary to sound and fix, to move on and to sound and fix again, without any attempt being made to add soundings between the fixes. The sounding marks used for fixing had to be carefully sited. Marks too close to the horizon would be obscured by icebergs coming into the line of sight; while those sited too high would yield, by reason of their difference in height, a non-horizontal, and therefore possibly erroneous, angle.

As the hydrographic survey progressed—sounding, triangulating, and marking the off-lying navigational dangers—the scientists in the expedition made use of the frequent stops at different islands and along the mainland coast to pursue their researches. Much laborious overland trekking by the geologist was avoided by landing him, at his request, exactly where he wanted along a given piece of coastline. The doctor was able to make full use of mobility too. Marine life close to the water's edge was collected, and rock pools sometimes 1000 feet above the sea were examined. For those taking part in none of these activities, and for all of us while on passage, there was plenty to see and take note of. Travelling in a small boat along this mountainous coast gives unique opportunities of observing the infinite variety of marine life which abounds. On occasion, killer whales gave cause for alarm, and we found they could only be discouraged from taking an unhealthy interest in the motor-boat from very close quarters by switching on the echo-sounder. At each survey station a permanent record was left, either by painting on an exposed rock close by, or by building a cairn. The area and approaches were photographed and sketched and the station itself identified on the air photographs.

By March 1958 the ice had largely receded from Grandidier Channel, but it was never completely absent. At times, as we proceeded further away from the Argentine Islands, dense sections of brash and pack ice were encountered. It was possible, however, to keep moving southward and at last the triangulation was joined to the Ferin Head station network, and the expedition reached Ferin Head. From here a short trip to Mutton Cove, fifteen miles to the westward, brought us to the site of one of the British Graham Land Expedition camps, and a small depot left twenty-two years previously was found; the food had largely perished, but some diesel oil remained intact. With the autumn drawing in, further survey work to the south of Ferin Head was not practicable, but a three-day trip southwards across Darvel Bay to the head of Lallemand Fjord provided useful sketch survey information. On this trip, the motor-boat reached latitude S. 66° 38′, thus becoming possibly the smallest vessel to cross the Antarctic Circle unattended and under its own power.

Several months of constant steaming in ice had taken its toll and urgent repairs had to be effected; copper sheathing which had been torn off was replaced and a badly bent shaft and a damaged propeller were renewed. The expedition then moved northward again, filling in any gaps left during the southern journey. The weather was quickly deteriorating, and by the time the Argentine Islands were reached, new ice was forming fast on the sea. R.R.S. *John Biscoe* arrived to pick up the expedition shortly afterwards; five days later, safely aboard and moving towards the Falkland Islands, we heard from our friends at the Argentine Islands station that they were now walking in perfect safety where we had steamed in the motor-boat a week before.

Thus ended the work of two seasons; there remained the assessment of what had been achieved and much compilation and drawing to be done. About two thousand square miles of the west Graham Land coast had been triangulated, and its coastal waters and off-lying islands charted The hydrography was necessarily sketchy in places, but the main passages and channels had been examined in more detail, and it was hoped that the completed charts would give the Masters of ships passing through

the area more confidence than they had had in earlier years. A geological examination of approximately 2000 square miles of coastline and off-lying islands had been made, and the resultant geological map promises to be one of the most precise and accurate of any in Antarctica. Other allied scientific studies in marine biology, palaeomagnetism, and human physiology all provided valuable material.

These results are tangible, but perhaps just as important in the final assessment of this combined expedition is the positive proof that it is possible to explore an area of wild coastline, if anything, more thoroughly from a small well-found boat than from a large shore base. The concept is not new, for Captain R. E. D. Ryder, V.C.,[6] and members of the British Graham Land Expedition had found exactly the same thing when they voyaged in similar waters. Our motor-boat had steamed just over 5000 miles under its own power in Antarctic waters and, apart from minor repairs, had given no cause for alarm; even in these days of acceptance of mechanical reliability, the tribute to British design and workmanship stands. And so to the future of hydrographic survey in west Graham Land. Much depends on the current ice conditions. Given a clear ice year, and making full use of the tellurometer, with its immense advantages, I consider that further hydrographic units of a similar sort could continue to chart and explore great areas of this fascinating, beautiful, and still largely unknown coast, with economy and success.

Appendix

Members of the party in 1956–7:

Lieut. C. J. C. Wynne-Edwards, R.N., hydrographic surveyor in charge; L/S A. R. Milnes and A/B J. Walsham, survey recorders; A/B D. Dickinson and A/B E. Savage, seaman assistants; and M.E.(1) O. Lynch, boat's engineer.

Members of the party in 1957–8:

Lieut. C. J. C. Wynne-Edwards, R.N., hydrographic surveyor in charge; L/S A. R. Milnes and A/B V. T. Bloor, survey recorders; A/B K. Kenyon and A/B A. Lloyd, seamen assistants: M.E.(1) O. Nash, boat's engineer; B. Holmes and F. E. Wooden, surveyors (F.I.D.S.); R. Curtis, geologist (F.I.D.S.); Flt./Lieut. D. Jones, R.A.F., medical officer (F.I.D.S.); and P/O E. C. Clapp, R.N., wireless operator (F.I.D.S.).

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See also: The Admiralty, Hydrographic Department: 'Antarctic Pilot,' 2nd edition, 1948.
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Directorate of Overseas Surveys Map: Sheet W65 64.

DISCUSSION

Afternoon Meeting, 24 November 1958

Before the paper, the CHAIRMAN (Major-General R. LL. BROWN) said: The Society's interest in hydrographic survey dates back a long time. One of Mr. Kirwan's predecessors, as long ago as 1837–41, Captain Washington, after leaving the post of Secretary

to the Royal Geographical Society, became Hydrographer of the Royal Navy and I think that since then almost every Hydrographer of the Navy has been a Fellow of this Society. The lecturer tonight is Lieutenant Wynne-Edwards, and he joined the Royal Navy from Dartmouth in 1944. Young as he is, he has travelled the world a good deal and he has been in many parts of it, including Korea and the West Indies. He was appointed to the Royal Naval Hydrographic survey unit which was working in Graham Land waters in 1956 and has spent two seasons there, in the Antarctic.

Lieutenant Wynne-Edwards then read his paper

The CHAIRMAN: Would Mr. Stephenson, Reader in Surveying at the Imperial College of Science, like to say something?

Mr. A. STEPHENSON: I should like to thank Lieutenant Wynne-Edwards for his extremely interesting lecture in which he described two seasons of excellent work. Having done some surveying in the same area, over twenty years ago, I was particularly interested. One tends to think that with the great improvements that have been made in equipment in the last twenty years things would have become much easier. In certain respects that is the case. Lieutenant Wynne-Edwards referred to his 29 ft. boat as "tiny"; we were very happy with a 15-footer! But his difficulties and responsibilities certainly increased with the larger craft and this is reflected in most branches of the work being undertaken in the Antarctic today. In addition, with the improved equipment and communications, a higher standard is expected and one is now hoping for almost the same standard of work to be done in the Antarctic as is done in the much more civilized parts of the world. From what we have seen and heard this afternoon I do not think we are far off that standard, and I am certain that the F.I.D.S. and other expedition ships of the future will be very grateful for the detailed work that Lieutenant Wynne-Edwards's team has been able to accomplish. I am very glad that the Hydrographic Department of the Admiralty has been able to carry out this project, and I sincerely hope that we shall see more young hydrographic officers, of the calibre of our lecturer this afternoon, in the Antarctic in the near future.

The CHAIRMAN: I wonder if Dr. Adie, of the Falkland Islands Dependencies Survey at Birmingham, would like to add a few words on the geological aspect of these expeditions.

Dr. R. J. ADIE: I thoroughly enjoyed Lieutenant Wynne-Edwards's talk tonight; I think he has been very modest indeed. During the last southern summer I was one of the innocent bystanders who watched his expedition at work. The thing he did not tell you is that his party worked very nearly twenty-four hours a day most of the time. One point I should like to make is how important it is for a small independent party, such as the one our lecturer has been talking about, to collaborate and cooperate with an organization such as the Falkland Islands Dependencies Survey. I am sure that in recent years this is the first time that there has been such collaboration, and I think this may lead to something that a few of us have been thinking about for the future: that is, small independent parties working during the summer months from a survey boat in the more accessible parts of west Graham Land where they can achieve results quickly. Lieutenant Wynne-Edwards has told you a little bit about the geology. A tremendous number of specimens were collected from this area during a very few weeks and a certain amount of the laboratory work has already been done. We find that between the Lemaire Channel and Base J the usual pattern of west Graham Land emerges; that is, nearly all of the rocks there are Jurassic volcanics which are intruded by Andean diorites, granites and gabbros. But, of course, there are quite a number of very interesting aspects of this intrusive phenomenon, which we have not yet completely worked out. There is one other topic, palaeomagnetism, that was studied. I do not want to go into an explanation of what palaeomagnetism is, but I can assure you that the three tons of rock which were collected have now almost been examined. They have been cored and within a very short space of time the results will be available.

The CHAIRMAN: Perhaps Admiral Collins, Hydrographer of the Navy, would like to add something? His department has been responsible for this work.

Rear-Admiral K. St. B. Collins: It is true that as Hydrographer of the Navy I was responsible for this expedition. In a way, this lecture was Wynne-Edwards's reply to my queries when he reported back to me. I asked him: "How did you get on? What have you done?" And tonight you and I have received the answers! I hope you will all agree that this expedition in this out-of-the-way part of the world was well worth while. The object was twofold: firstly, to find out whether we could, in fact, in these ice-bound waters, achieve any hydrographic work at all and, secondly, to get a first-hand report on the work to be done in the future and the problems and time involved. The lecturer tonight has answered the first in the affirmative; the work brought back has exceeded my expectations. And now we know, if the need for more intensive hydrographic work should arise in the future, exactly what the work will entail and the best way to tackle it.

Mr. J. Wright: Could the lecturer give us an idea of the accuracy of the triangulation achieved?

Lieut. Wynne-Edwards: Yes: the triangulation was computed at the Directorate of Overseas Surveys. The triangle closures, based on six or eight runs at each station, were not allowed to exceed, on major figures, more than twelve seconds at the very most.

A Fellow: I'd like to ask the lecturer what was the range of the motor-boat. It seems to have covered great distances, but no mention has been made of fuel.

Lieut. Wynne-Edwards: Thank you for reminding me of a very important matter. The logistics of fuel were foremost in our minds: the motor-boat consumed about a gallon an hour; the tanks held about forty gallons, and another forty gallons were carried in jerrycans, thus giving eighty hours' endurance. A fifty per cent. safety margin and a speed of 6 knots would give a range of 240 miles. In ice, this could be less and a number of fuel depots was established along the coast as a reserve.

Captain Connell (Hydrographic Department): Did you have any brushes with leopard seals? I've heard they are extremely ferocious and attack on sight. And killer whales? I've heard they have an unpleasant habit of getting round ice floes and turning some luckless seal off into the sea. This might equally well have been the fate of you and your boat crew!

Lieut. Wynne-Edwards: Leopard seals were always treated with great respect; no member of the party ever ventured near them. On several occasions killer whales joined company with the motor-boat and were only prevented from coming dangerously close by switching on the echo-sounder. This always acted as a deterrent. I have no doubt a rowing-boat would be attacked by these animals if met with in open water.

Mr. Snell: Could you tell us how deep these channels were between the islands?

Lieut. Wynne-Edwards: The deepest sounding achieved was about 585 fathoms. The average depth was between 100 and 200 fathoms.

THE ELWY RIVER SYSTEM, DENBIGHSHIRE

C. EMBLETON

IN RECENT YEARS, an increasing number of conflicting views has been expressed in regard to the origins of the drainage of Wales. The wide differences of opinion, some of which are conveniently summarized by T. N. George,[1] obviously reflect the fact that detailed studies of drainage evolution are still lacking in many parts of Wales; until a more complete coverage is available, arguments will continue to be based mainly on speculation. The majority of workers agree, however, that some form of superimposition is necessary to account for some of the discordant elements in the drainage pattern. The present study, concerned with part of North Wales, has for its aims the reconstruction of the original drainage pattern in the area, and the recognition of various later stages in the development of the river system. It is only to be expected that the evidence available for the later stages is the most satisfactory and reliable, but there are also many definite indications of the form of the original drainage. On this basis, it is possible to discuss the origins of the drainage of Denbighshire in the light of hypotheses advanced to account for the drainage of Wales as a whole.

The principal methods used in this work consist of an examination of river long profiles, valley-side benches, river alignments and a number of prominent wind-gaps in the area. The valley-side benches have proved most useful in providing definite evidence for river diversion; mainly by capture, but also, in the Pleistocene, by glacial interference. By eliminating as far as possible all cases of diversion from the present river system, a relatively simple pattern of drainage is arrived at; and it is suggested that this is the original pattern. The valley-side benches, together with the present river profiles, also point to considerable rejuvenation in the area, which can only be explained in terms of relative movements of land and sea level; stages in the rejuvenation can be established, and some tentative remarks on their dating will be offered.

Relief and geology.—The main river system under discussion is that of the Elwy and its tributaries (Fig. 1), draining about 80 square miles of the Denbighshire uplands to the Vale of Clwyd. Strictly speaking, the name Elwy is applied only to the river downstream from Llangerniew, and above this point, the main river is termed the Cledwen. The larger tributaries of the Elwy rise on the moorland at 1200 to 1300 feet, and flow generally northwards. The main Elwy, running eastwards for most of its course, collects these tributaries in turn, and the combined stream passes into the Vale of Clwyd two miles south of St. Asaph. It is very striking that the Elwy possesses no important left-bank tributaries.

Two geological formations underlie most of the area—the Lower Ludlow (of the Middle Silurian) and the Lower Carboniferous (Figs. 2 and 3). The Ludlow rocks have been investigated in great detail by P. G. H. Boswell[2] who has mapped them on the basis of graptolite zones; an attempt at lithological mapping of part of the area was also made by O. T. Jones.[3] Boswell's interpretation (Fig. 3) portrays a complex structure, with faults too numerous to be reproduced on small-scale maps. Jones's map (Fig. 2) differs with regard to the faulting and the mapping of the "disturbed beds" which occur at various horizons in the Ludlow.

The geomorphologist, seeking to determine the main geological features important in the evolution of the present landscape and river pattern, has to accept the fact that we are still far from having a clear picture of the geology of the Ludlow in northern Denbighshire, an area not amenable to purely lithological mapping by reason of the scant variations in rock-type. It is fortunate, however, that variations of rock resistance in the Ludlow appear on the whole to be comparatively small. As will be seen later, it is the fault pattern which has been more significant in the evolution of the river system. The rocks of Denbighshire have been greatly shattered by faulting; complex faulting

can be readily demonstrated in the Carboniferous areas, but less easily so in the Silurian country. Nevertheless, both Boswell and Jones appear to agree on the importance of faults of NNE. to NNW. trend in the Silurian, and Boswell[4] recognizes a subsidiary group with E. to ENE. trend. It is unfortunate that major faults are rarely visible in sections; and it is also unfortunate that nowhere can faults in the Silurian be proved to affect the Carboniferous, though there is often a strong presumption that they do. The age of the faulting in the Silurian is therefore in doubt, and

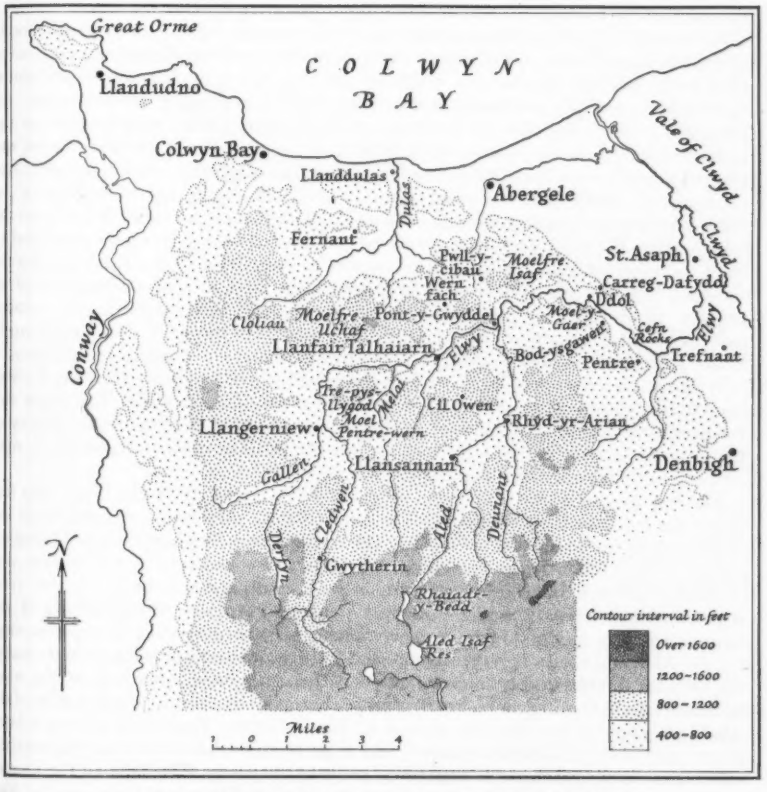

Fig. 1. Relief and drainage of northern Denbighshire

whilst much of it is almost certainly Caledonian, some may be post-Carboniferous, and some post-Triassic.[5]

Between the Silurian and the basal Carboniferous there exists a great unconformity which results from the removal of up to 3000 feet of Lower Ludlow rocks alone.[6] The Carboniferous rocks form a rim around the north and east of the Denbighshire uplands, the strata dipping outwards at angles of 20° to 30°, and presenting a discontinuous but very prominent escarpment overlooking the Silurian area. This escarpment is formed in the Carboniferous Limestone which in places reaches a thickness of 2000 feet. Under the Limestone there occurs a variable thickness of Basement Beds.[7] These deposits have often proved less resistant to denudation than the overlying Limestone, and in places give rise to a depression in front of the

Limestone escarpment. Upper Carboniferous and Triassic rocks occur in the Vale of Clwyd, but do not concern us at the moment. In the Pleistocene, the main uplands of Denbighshire were submerged at times by Welsh Ice moving generally east and north-eastward from the Snowdonian and Arenig areas; the coastlands and marginal uplands were invaded by Irish Sea Ice moving south. The line of junction of the two ice sheets naturally varied from time to time but, at least at one stage, the northern ice reached the Lower Elwy valley. Features due to glacial erosion are not often obvious in Denbighshire; deposition, on the other hand, was widespread, and careful study of the drifts is essential to any study of the river system.

Field-work.—Northern Denbighshire is covered by about thirty-two quarter-sheets of the Ordnance Survey 6-inch map. Field-work has consisted of mapping outlines of land forms and the distribution of glacial deposits, the determination of additional spot-heights, and the surveying of river long profiles and valley cross-sections. An aneroid was used on only one occasion for fixing approximate spot-heights on the open moorland near the head of the Cledwen; at all other times, an Abney level was preferred for this work since it is largely independent of weather conditions and, over distances not more than a quarter of a mile and with angles not exceeding 15°, is capable of greater accuracy than most aneroids. Distances were taken direct from the 6-inch map. For river profiles, a hand-level supported on a 5-foot cane was used in most instances to reduce nearby bench-marks to river level. The Ordnance Survey 100-foot contours up to 1000 feet have also been used in the construction of all profiles. In the last few years, the Ordnance Survey have been relevelling the county, and establishing many new lines of levels. The records of this work were kindly made available by the Ordnance Survey, and have provided many new points of reference.

With such large areas of Denbighshire obscured by drift and peat, mapping of these superficial deposits in some areas has occupied a considerable time. The main aim has been to ensure that all land forms used in investigating the pre-glacial history of the river system are cut in solid rock; it has not been possible everywhere to map continuous drift boundaries due to lack of time.

The long profiles of the main rivers (Fig. 4).—The larger rivers rise over 1200 feet above sea level on the Denbighshire moors. In their uppermost courses, with the exceptions of the Melai and the Gallen, the streams flow sluggishly in broad shallow valleys. Parts of the Aled valley in this section are now submerged by the construction of small reservoirs, but the bottom profiles were kindly made available by the water engineer, Rhyl Urban District Council. At about 1150 feet, the gradients of the streams steepen very suddenly, and the valleys become gorge-like in cross-section. On the Aled and Cledwen, several large and picturesque waterfalls are to be found as the streams tumble deeply into the gorges. Rhaiadr-y-Bedd, once one of the most beautiful falls in Denbighshire, but now somewhat spoilt by the impounding dam of the Aled Isaf reservoir just above it, is some 75 feet in height. These falls are not related to any particular geological formation, and must be the result of intense rejuvenation which has not yet reached the uppermost parts of the rivers. The falls on the Derfyn occur near the base of the Ludlow (Nantglyn Flags); Rhaiadr-y-Bedd on the Aled occurs higher up the Nantglyn Flag series; while the falls on the Cledwen are entirely in the Denbigh Grit Series of the Wenlock. Below the gorge sections, the stream gradients become rapidly reduced and the profiles more regular, although at intervals knick-points can be detected. There is no clear example of a major knick-point being directly related to a particular formation, though it must not be forgotten that the geological structure is still incompletely known. Neither are the knick-points related to the junctions of tributaries. At Ddol, the Elwy crosses on to the Carboniferous Limestone, but without any discernible change in gradient.

The valleys in cross-section (Fig. 5).—Along most parts of the valleys, the effects of rejuvenation can be clearly seen in the existence of remnants of former valley floors high above the present incised river. There is little doubt that these broad valley-side benches are the results of successive rejuvenation of the river; their surfaces are even now remarkably smooth, cutting across solid rock, and showing no relation with

the local dip of the latter. By simple extrapolation of the transverse slopes of these benches, heights of former valley floors can be obtained. The only problematical point is how far the benches have suffered during periods of later erosion, and especially, whether they have been significantly altered by glaciation. But when one finds similar benches throughout the whole of the Elwy valley and its tributaries, and at heights which are absolutely consistent with the reconstruction of a number of

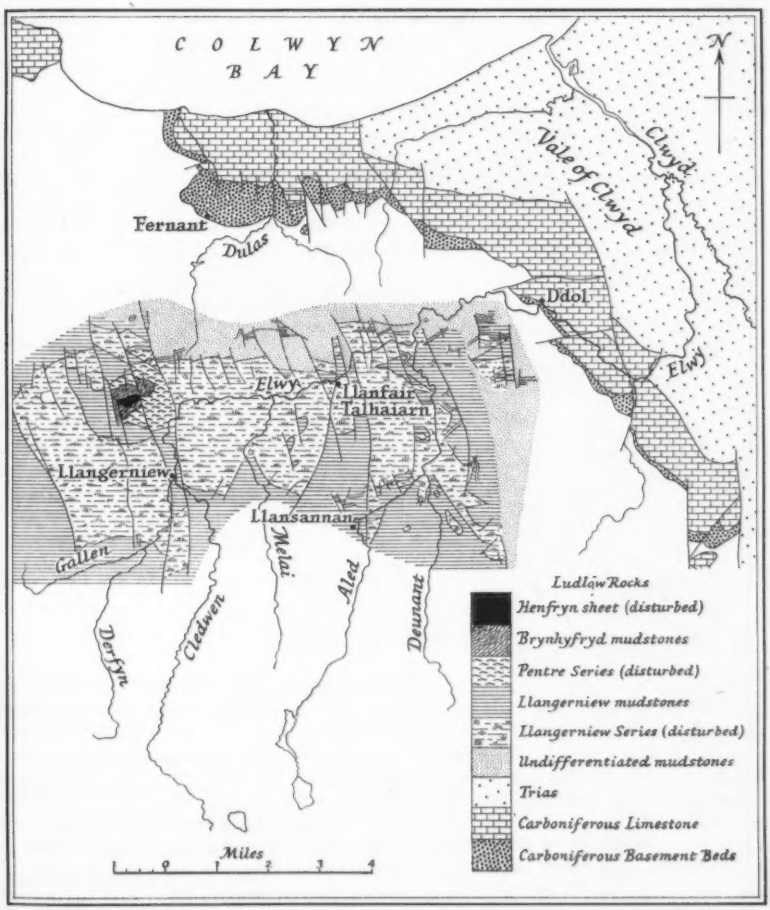

Fig. 2. Geology of northern Denbighshire (Silurian rocks after O. T. Jones, 1937)

former valley floors, there is no doubt that glaciation has apparently done little to modify their forms. It would be unnecessary here to give further details of benches in the Elwy system; a total of 82 cross-sections has been surveyed, and 32 of them are reproduced in Figure 5. Three general points must be made, however. All extrapolations have been carried out by eye, so that the heights of former valley-floors have a probable error of at least ± 10 feet. Secondly, though drift deposits are not shown on some of the sections due to the reduction of scale, all features used in making

reconstructions are known to be cut in solid rock. Thirdly, the cross-sections show clearly the necessity for accurate surveying of several heights on each bench, for the majority of benches have a considerable gradient towards the valley centre; simple mapping of the outlines of benches would not permit the determination of heights of former thalwegs.

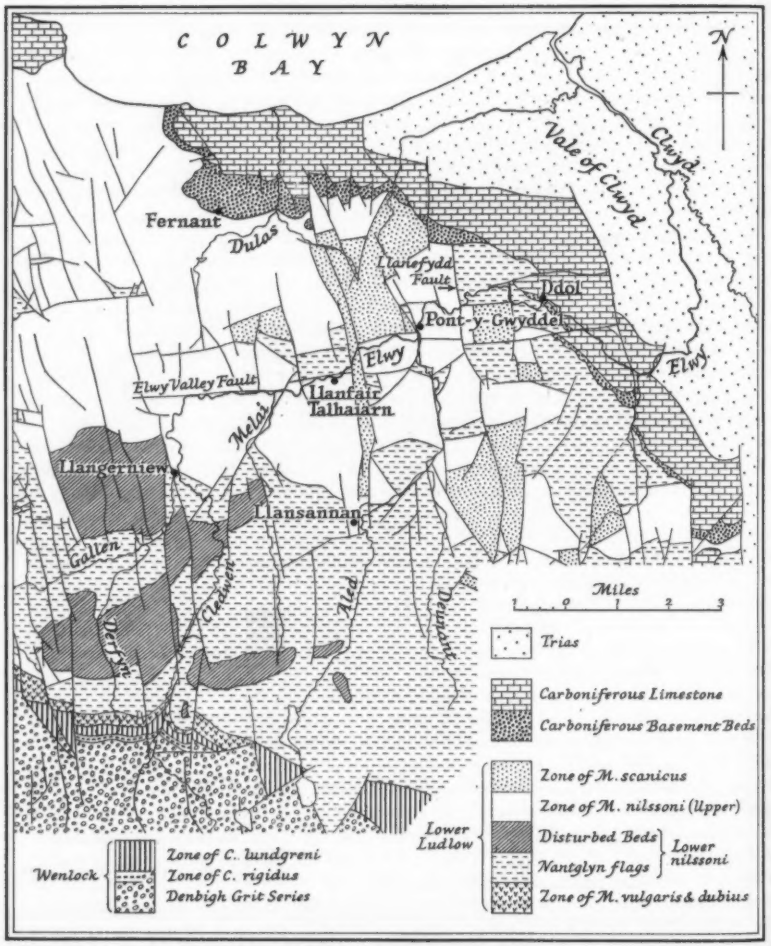

Fig. 3. Geology of northern Denbighshire (Silurian rocks after P. G. H. Boswell, 1949)

The pattern of the river system.—The way in which the river Elwy in its course between Llangerniew and the Vale of Clwyd receives a number of north-flowing tributaries has already been mentioned. It has also been pointed out that the Elwy receives no significant tributaries from the north; indeed, the Elwy itself lies very close to the northern rim of its catchment area. This northern rim (Fig. 1), from Cloliau in the west, past the two masses of Moelfre Uchaf (1299 feet) and Moelfre Isaf

(1039 feet), to the Limestone ridge near Cefn, has two large gaps in it, leading from the Elwy valley northwards to the lower land occupied by the Dulas and other small streams. The gaps are at Wern-fach (642 feet, with many rock exposures), and at Pwll-y-cibau (717 feet, with some drift). A tract of unusually flat land at 1000–1040 feet also forms the rim west of Moelfre Uchaf. One of the present north-flowing tributaries of the Elwy, the Aled, is heading straight for the Pwll-y-Cibau gap before being carried away east by the lower Elwy. The Cledwen is similarly heading for the flat land at 1000 feet west of Moelfre Uchaf, before turning the great bend of the Elwy north of Llangerniew. The Wern-fach gap does not now stand opposite any major stream entering the Elwy from the south, but in line with it, and to the south, there is a further gap at Cîl Owen (869 feet) which provides a direct route to the Aled valley at Llansannan. Merely from a study of the river pattern, one might conclude that the original river system was one of generally north-flowing streams, which had later been intercepted by the Elwy and diverted eastward. Supporting evidence is to hand, however, in the various rejuvenation stages which the rivers have undergone, and which testify to the many changes of river pattern which have taken place.

The former courses of the rivers.—Using the valley-side benches, and some prominent knick-points probably due to rejuvenation, a number of former thalwegs of the Elwy

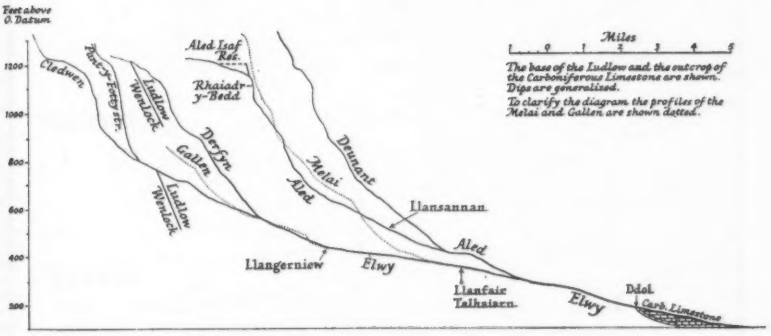

Fig. 4. The long profiles of the present rivers

and its tributaries have been reconstructed (Fig. 6). For simplicity, each of the Elwy's tributaries is shown separately on this diagram. In the uppermost portions of the Cledwen, Derfyn and Aled rivers, there are traces of old thalwegs between 1150 and 1250 feet. At their upper ends, they seem to merge approximately with the present rivers above the main waterfall sections. The thalwegs can only be traced with any certainty for distances of two to three miles, but appear to have very gentle gradients—less than 20 feet per mile. Continued northward, they would pass above the tops of neighbouring hills such as Tre-pys-llygod (1005–1048 feet), and in the case of the Derfyn-Cledwen, would just clear the northern rim of the Elwy basin at about 1030 feet, in the area which was mentioned as being bevelled at this height west of Moelfre Uchaf. Although the evidence is very limited, it is possible that it points to a very early stage of the river system, when a series of independent north-flowing streams (Fig. 7*a* and 7*b*) continued across what is now the northern watershed of the Elwy basin at heights of 1000 to 1050 feet. They would have passed over the present coastline at 1000 feet in round figures; and it may be that they were related to the Middle or Low Peneplain stages described by E. H. Brown.[8]

The next stage discernible in the development of the river system involves a very important change (Fig. 7*c*). A series of benches indicates lowering of the rivers to heights of 870 feet at Llangerniew, 920 feet at Llansannan, and 820 feet at Llanfair Talhaiarn. But the Cledwen-Elwy now no longer continues northward over the

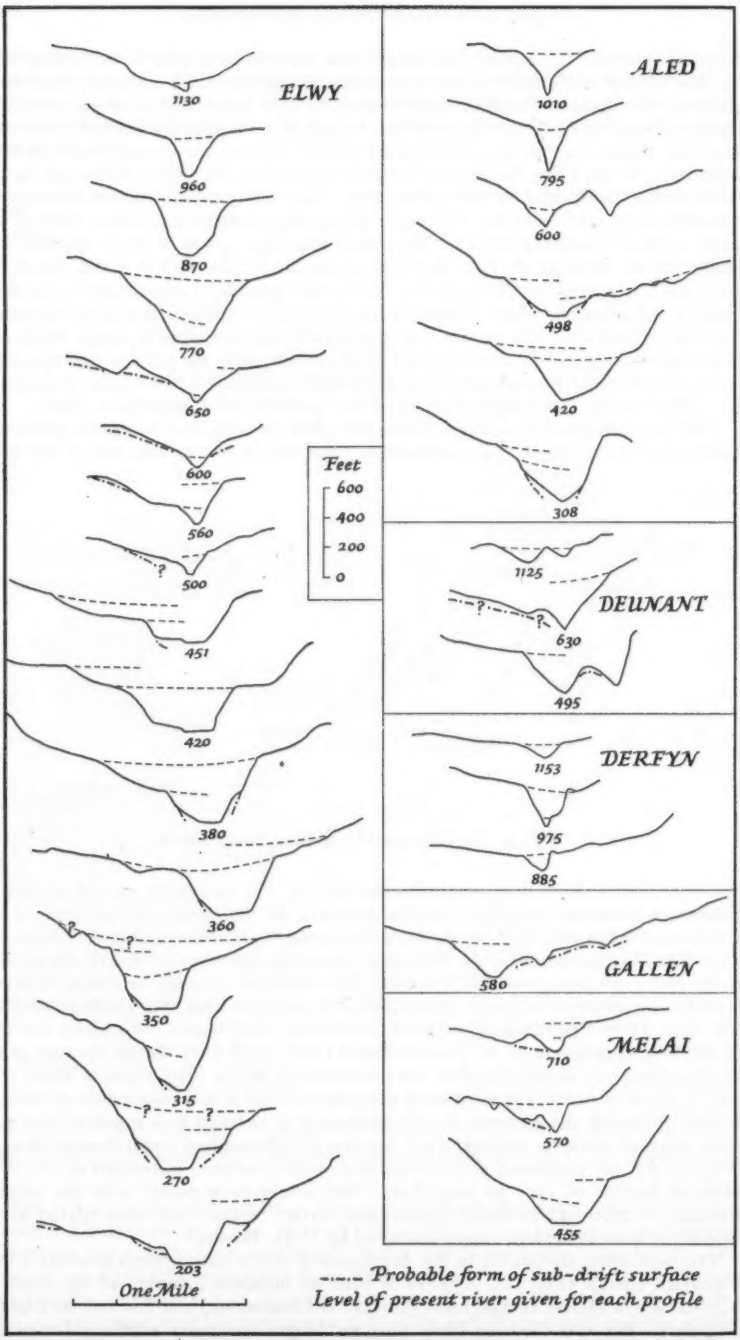

Fig. 5. Some cross-sections of the River Elwy and its tributaries

upland west of Moelfre Uchaf; instead, the benches swing round the great bend of the present valley north of Llangerniew, and join those of the Aled at Llanfair Talhaiarn. This change must be ascribed to capture, due to the cutting of the valley westwards from Llanfair Talhaiarn. North of this village, the combined Aled-Elwy appears to have passed through the Wern-fach gap (at about 810 feet); how far it proceeded beyond this before reaching base-level is uncertain, but flattening of the profile indicates that the coastline was not far distant. A fall of base-level between this stage and

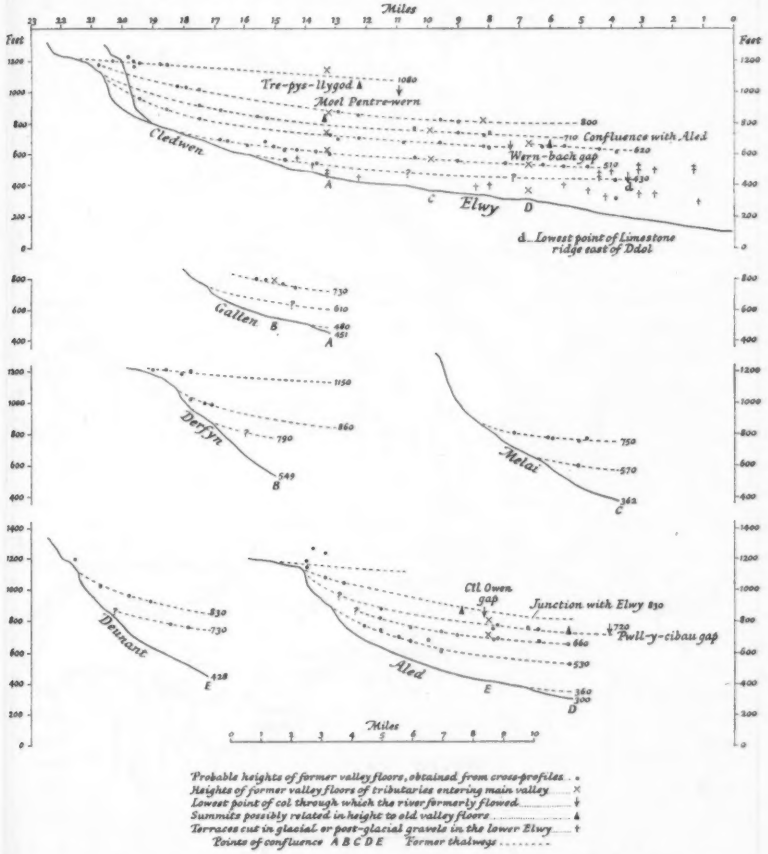

Fig. 6. Present and former long profiles of the River Elwy and its tributaries

the previous one is certainly involved, and must have promoted the actual capture described.

The second major change in the river system concerns the Aled alone (Fig. 7*d*). Up to this point, it had been following a course north from Llansannan to Llanfair Talhaiarn; at the last stage, it passed through the Cîl Owen col (midway between these two villages) at about 870 feet. It now appears that the Deunant, flowing northward and parallel with the Aled, developed a left-bank tributary running south-west from Rhŷd-yr-arian (R on Fig. 7*d*), and intercepted the Aled at Llansannan. The Aled was thus turned into the Deunant, and the combined river flowed north through the

Pwll-y-cibau gap, and joined the Elwy a little farther on. Once again, changes of base-level were involved, the heights of the rivers falling to 830 feet at Llansannan (the Aled), and 730 feet at Llanfair Talhaiarn (the Elwy). The confluence of the rivers Aled and Elwy was probably at about 700 feet, and by short extrapolation, the

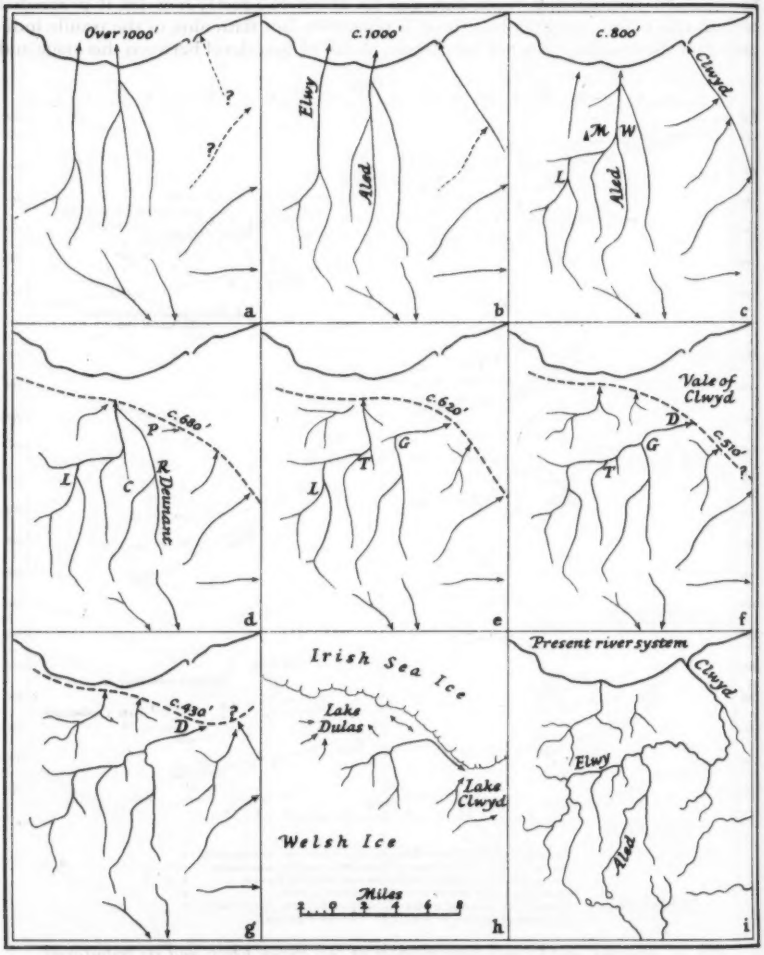

Fig. 7. Stages in the evolution of the Elwy river system

Note: *The present coastline is shown on the diagrams for reference. The broken lines on stages d–g suggest possible positions and heights of former coastlines. Stage h is intended to represent conditions at the close of the last main glaciation of North Wales. C = Cil Owen, D = Ddol, G = Pont-y-Gwyddel, L = Llangerniew, M = Moelfre Uchaf, P = Pwll-y-cibau, R = Rhŷd-yr-arian, T = Llanfair Talhaiarn, W = Wern-fach.*

combined stream would pass over the old cliffline behind Abergele at about 680 feet. It will be seen that this is the only time in the development of the river system in which the Pwll-y-cibau gap is occupied by the Aled, which seems to have passed

through at about 710 feet: this is about 10 feet below the present lowest point of the gap but, as remarked earlier, there is a little drift in it. Relics of this stage are also found in the valleys of the Elwy and Melai; at Llangerniew, for instance, the Elwy had now fallen to a height of about 800 feet, and the flat summit of Moel Pentre-wern (800–820 feet) is, in all probability, related to this stage.

The third change in the river system is probably the most interesting. It represents

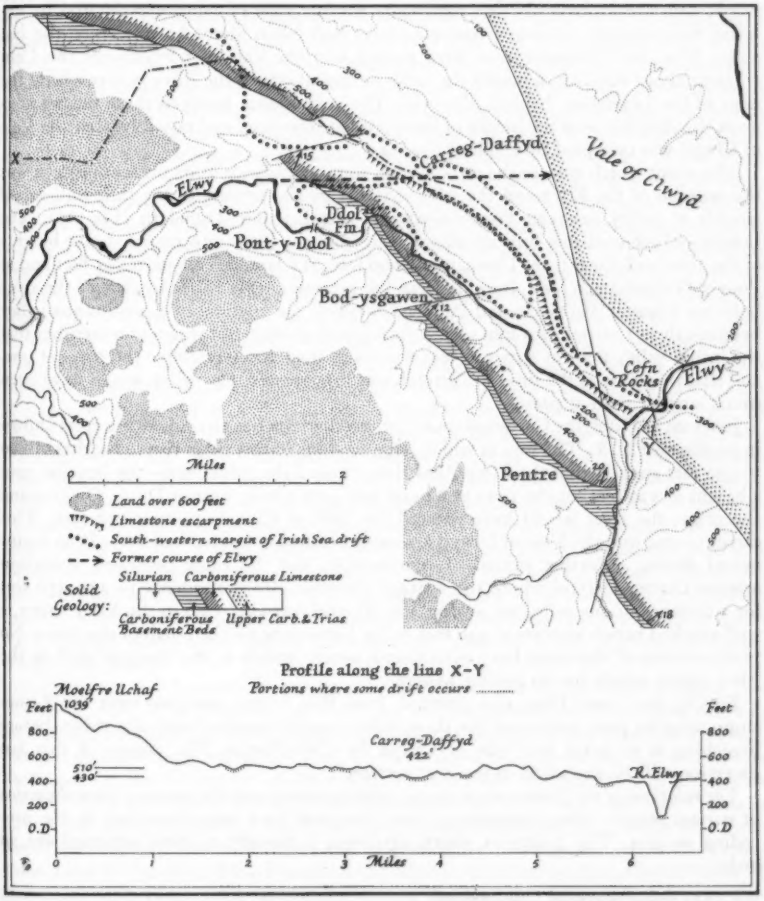

Fig. 8. The lower Elwy valley

a period when the Aled-Deunant rivers were completely separated from the Elwy and its tributaries, and it represents the last time that any of the rivers passed through the Wern-fach gap. The pattern of the rivers is shown on Fig. 7*e*. At Llangerniew, rejuvenation had lowered the Elwy to 720 feet, at Llanfair Talhaiarn to 650 feet and the valley floor clearly merges with the present lowest part of the Wern-fach gap (640 feet). In the Aled valley, the river had fallen to 750 feet at Llansannan, and the combined Aled-Deunant to 660 feet at Pont-y-Gwyddel (G on Fig. 7*e*). It might at

first sight seem from these heights that the Aled-Deunant below Pont-y-Gwyddel had turned sharply west to join the Elwy at Llanfair Talhaiarn, but there is no supporting evidence for this. On the contrary, the valley-side benches at Pont-y-Gwyddel turn in the opposite direction, eastward, and follow what is now the lower Elwy valley. It is quite clear that at this time there was no major valley linking Pont-y-Gwyddel with Llanfair Talhaiarn. Apparently, then, the Aled-Deunant, formerly flowing north from Pont-y-Gwyddel through the Pwll-y-cibau gap, had now been diverted eastward; and almost certainly this represents another case of capture promoted by external rejuvenation. It seems that base-level had fallen about 60 feet since the last stage. The Aled-Deunant must have passed into the Vale of Clwyd over the Cefn ridge at about 620 feet, a height the same as that at which the Elwy was reaching the edge of the Limestone behind Abergele. The coincidence between these figures suggests that 620 feet was the height of base-level at this time, and possibly, that the Vale of Clwyd was occupied by a gulf of the sea.

The event which gave to the river system some semblance of its present pattern was the reunion of the Elwy and the Aled systems by the cutting of the mile-and-a-half stretch of valley between Pont-y-Gwyddel and Llanfair Talhaiarn (Fig. 7*f*). The benches which continue through this stretch from the Elwy into the Aled give heights of the river as follows:—at Llangerniew 600 feet, at Llanfair Talhaiarn 545 feet and at Pont-y-Gwyddel 530 feet. Judging from the present deeply incised valley of the river between Llanfair Talhaiarn and Pont-y-Gwyddel, the opening of a continuous valley between these two points might seem a formidable matter, but we must remember that the initial valley floor at 530–540 feet was more than 200 feet above the present one, and that therefore at the time this stretch was first opened, the valley would have been much smaller than at present.

Just east of Ddol, the Carboniferous Limestone ridge has an undulating crest shown in profile on Fig. 8. The way in which large sections of this ridge rise to heights of 500 to 530 feet suggest that the Elwy-Aled river crossed the ridge here—the benches give a height of 520 feet for the river at a point just over a mile west of Ddol. On crossing the ridge, the river would have entered the Vale of Clwyd at about 510 feet. This direct course into the Vale of Clwyd across the Limestone ridge may have been maintained during a further period of rejuvenation, for the ridge possesses a portion around Carreg-Dafydd where the average elevation drops suddenly to 420–450 feet for a distance of one mile (see profile, Fig. 8), and just upstream in the Elwy valley, a well-marked bench appears at 430 feet in the Limestone on the north of the river. No further traces of this stage have been found, owing mainly to the banks of drift in the Elwy valley which rise to greater heights.

Finally, the lower Elwy was diverted from this course eastward over the Limestone ridge to pass south-east for three miles roughly parallel with the ridge, before breaching it to enter the Vale of Clwyd by Cefn Rocks. The causes of this last diversion will be discussed in the next section.

The relations of the former river courses with structure, and the causes of river diversion at various stages.—Five instances of river diversion have been described in the preceding section. The points at which diversion is thought to have occurred are, in order:—

1. 1½ miles north of Llangerniew.
2. Llansannan.
3. Pont-y-Gwyddel.
4. ½ mile north of Llanfair Talhaiarn.
5. Near Ddol.

In the case of the first four changes, there is some basis for believing that structural weaknesses, plus rejuvenation affecting the river system from outside, were responsible. The main difficulty one faces in analysing the possible influences of structure on the evolution of the river pattern is as stated in the introduction—the fact that the geological structure is complex and incompletely understood. There are, however, no

major lithological changes in the Ludlow which might encourage such adjustment to structure, and the dip and strike of the rocks seem too variable to have given rise to such systematic large-scale adjustment as has occurred. It seems much more likely that the fault-system is responsible. It is precisely on this subject that interpretations differ. On the one hand, Boswell does not hesitate to insert faults on apparently slender evidence, nor does he hesitate to locate faults beneath the wide alluvial floors of the larger rivers where necessary. On the other hand, Jones's mapping is in this respect much more conservative, and many gaps are left wherever there is doubt on interpretation of the structure. The principal faults on Jones's map (Fig. 2, p. 322) possess a north–south trend, but only in one instance does a major fault coincide with the course of one of the present trunk streams—the Elwy-Gallen around Llangerniew. As mentioned in the introduction, Boswell also places emphasis on north–south faulting, but adds a number of important east–west faults as well. Thus his "Elwy valley fault" runs due west for 2½ miles from the Melai-Elwy confluence, along this section of the Elwy valley (Fig. 3, p. 323); another runs along the valley due west for one mile from Llanfair Talhaiarn; and another follows the deeply-cut Elwy valley west from Pont-y-Gwyddel to a point north of Llanfair Talhaiarn. (Note that on Figures 2 and 3, faults affecting the Carboniferous are from maps of the Geological Survey.) The diversions described above could, according to Boswell's map, have been caused by headward erosion along fault-lines. The relation of faulting to river diversion in the case of the second diversion is less certain, though the unusual straightness and width of the Aled valley below Llansannan certainly give the impression that this section is fault-guided. The faulting below diversion three needs a little closer examination. A fault with east–west trend which shifts the base of the Carboniferous just north-west of Ddol (Fig. 3), continues in the Ludlow up part of the Elwy valley, possibly until it is cut off by the north–south Llanefydd fault. Upstream as far as Pont-y-Gwyddel, Boswell finds exposures too few to warrant the representation of any large faults along the Elwy valley, but observes that one may exist.[9] In short, if we accept Boswell's interpretation of the structure, we can conclude that the whole of the Elwy valley from the Carboniferous outcrop upstream to Llangerniew and beyond is fault-guided. Furthermore, the whole aspect of the Elwy's course below Llangerniew is characteristic of a stream picking its way among faults crossing mainly at right angles—a series of straight east–west portions linked by shorter north–south reaches. It is the writer's belief that the first four diversions listed are the direct result of rejuvenation encouraging headward erosion along these faults, and eventually producing one continuous master stream, the Elwy.

It now remains to consider briefly the probable causes of diversion number five (Fig. 8, p. 328). The behaviour of the Elwy is most unusual in this neighbourhood, for although the river turns to flow parallel with the Carboniferous Limestone escarpment, it proceeds on a course obliquely to the strike of the Limestone, and no obvious weaknesses in the Limestone are known which might have led the river to prefer this course. If the river had in fact developed a course along the strike of the basal Carboniferous, we might be justified in suggesting a subsequent origin for this portion of the Elwy, and capture around Ddol of the original Elwy flowing east across the Limestone ridge at 430 feet. This hypothesis of capture finds no confirmation in terms of structural adjustment, then, unless one accepts the view that there is in fact some undetected line of weakness in the Limestone here. Such problems are greatly increased by the way in which this portion of the Elwy valley has been choked with drift. On the western bank of the river, the solid rocks are only seen at two places below 600 feet (excepting minor exposures in the floors of small ravines draining to the Elwy)—at Bod-ysgawen, maximum height of the Limestone 456 feet) and at Pentre (486 feet). These two exposures are both higher than the Elwy's previous course across the Limestone ridge at 430 feet. Their height and position show, therefore, that the lower Elwy cannot have been pushed over to the east from an original course along the basal Limestone by accumulations of drift in the west of the valley. The present course well within the Limestone, and east of the two exposures mentioned, seems to

be the only one which the river has ever adopted here. There is one other difficulty which any hypothesis of capture would encounter: the shortest course of the Elwy to the Vale of Clwyd is its former one directly over the Limestone ridge east of Ddol, and the present course is more than two miles longer. Thus, unless one can demonstrate some important weakness in the Limestone along the new course, one cannot point to any advantage which a capturing stream would have had.

Boswell [10] prefers another interpretation of the origin of the Lower Elwy's course. His general concept is that the lower Elwy has been forced into its present course by a barrier of ice to the north-east. He also suggests that the course of the Elwy "above Ddol and in the Carboniferous Limestone seems to be post-glacial in age, for the river has cut well down through Drift into solid rocks" (p. 185); but this point is quite unacceptable, for the drift is obviously occupying an existing valley. Returning to his general idea of glacial diversion of the lower Elwy, however, we must record the well-known fact in this area that the Irish Sea Ice, coming from the north, succeeded in sending a lobe up the Vale of Clwyd, as far south as Bodfari and Trefnant, and Mackintosh [11] even recorded a boulder of Criffel granite one mile south of Denbigh in 1879. He also records Lake District igneous erratics around Cefn caves (p. 440) above the lower Elwy valley. In 1887, McKenny Hughes [12] described a section of drift behind Ddol Farm where the northern drift can be seen overlying Welsh drift, and indeed in many other places along the Limestone ridge as far south as Cefn, the typical red northern drift can be seen in minor exposures, up to heights of 400 feet and over. An attempt is made on Fig. 8 to plot the present maximum extent of the red drift to the south and west. It is evident that at least at one stage, Irish Sea Ice from the north pushed up and over the Limestone ridge. If until such time the Elwy had been pursuing an eastward course across the ridge, the ice would certainly have impounded the river, and directed its waters south-eastward as a marginal stream. At the southern end of the Irish Sea Ice lobe in the Vale of Clwyd, the stream would be able to escape into the Vale. The last great still-stand of the Irish Sea Ice in the Vale is marked by the Trefnant-Bodfari moraine,[13] and this accords well with the site of the gorge past Cefn Rocks where the Elwy turns into the Vale.

The concept of glacial diversion of the Elwy as outlined above raises two important problems, however. First, the red drift occurring behind Ddol Farm (and described by McKenny Hughes) clearly was deposited after the excavation of the Elwy valley to its present depth. Thus, the ice which brought this drift cannot have been of the same age as ice which may have originally diverted the Elwy, and we would have to invoke an earlier ice-sheet from the north for this latter purpose. Secondly, up to the time when the Elwy ceased to follow an eastward course across the Limestone ridge from Ddol, a much higher base-level than at present must have been operating. The old Elwy apparently crossed the ridge at about 430 feet with a gradient of less than 10 feet per mile. As already suggested, it is not impossible that it reached the sea-coast of this time just beyond the Limestone ridge, in which case a sea at about 430 feet then existed in the Vale of Clwyd. Immediately following this, the supposed glacial diversion of the Elwy occurred, and we are faced with the problem of the juxtaposition of these two events—a pre-glacial 430-foot base-level, and the onset of glaciation. There is, moreover, little sign of rejuvenation of the old course of the Elwy just prior to its diversion; the lowest part of the Limestone ridge is now 422 feet and, although there are a few small areas of drift (see profile of Fig. 8), it is impossible for any buried channel more than 100 feet deep to exist, without making it a narrow ravine with sides sloping more than 30°. And even if such a buried channel were discovered, it would still only permit of a pre-glacial base-level lowered to 300 feet or thereabouts immediately before the arrival of the ice in the area.

It can be seen, then, that any attempt to explain the course of the lower Elwy by capture or glacial diversion encounters a number of problems. If equipment were available, thorough investigation of the sub-drift surface in the neighbourhood might provide more evidence for one of these hypotheses. The whole of the lower Elwy valley is very much choked with drift, which it is now excavating, producing large

meander scars such as those around Pont-y-Ddol. The balance of evidence at present seems to favour early glacial diversion of the Elwy; and whilst the necessity for invoking multiple glaciation is no disadvantage, it remains to be seen whether a high base-level of up to 400 feet immediately prior to the earliest arrival of ice from the north is acceptable. If it is acceptable, then stages in the denudation of this part of Wales involving a base-level below 400 feet must be definitely linked with the Pleistocene period. This obviously has considerable implications for some features in adjacent parts of Wales: for instance, the age of Greenly's "Menaian platform" at 200 to 300 feet in Anglesey.[14]

Summary of the rejuvenation stages deduced in the area (Fig. 7, page 327).—At this point, a brief recapitulation of the rejuvenation stages detected in the river system may be helpful before proceeding to discuss certain coastal features. An early stage involving a base-level not far short of 1000 feet may tentatively be recognized, though the palaeogeography of this period is very uncertain. At the next stage, the now combined Aled-Elwy river crossed the present north coast at about 800 feet; and later still at about 680 feet. Temporary separation of the Aled and Elwy is linked with a height of 620 feet for each of their thalwegs at the points where they cross the present steep outer edge of the Limestone uplands; the Elwy just south of Abergele, and the Aled just east of Ddol. With the abandonment of the Elwy's northward course towards Abergele, river level again fell, and the combined Elwy-Aled river crossed the ridge near Ddol at 510 feet and later at 430 feet. Further rejuvenation stages have not been separated, and indeed, as already remarked, may be tied up with the events of the Pleistocene which have yet to be unravelled in this area.

At least some of the figures given above may represent the base-level of the period. The principal difficulty is in trying to locate the former coastline. The latter, in the case of all but the first ("1000 foot") stage, cannot have lain further south than the line of uplands Cloliau-Moelfre–Uchaf-Moelfre–Isaf-Moel-y-Gaer (Fig. 1), for these all rise to heights of 900 feet and over at present. The heights at which former river profiles pass through gaps in these uplands are given in the first column of the table below, and must represent the upper limit of base-level for each stage. The second column gives the height at which the profiles cross the edge of the Limestone uplands. This edge was until recently a sea-cliff—certainly in the section from Abergele westward, and probably south-eastward from Abergele for a few miles. It rises usually without break to 400 feet and over, and since its position is structurally controlled (at the junction of the Carboniferous Limestone with the less resistant Trias), it may have marked the margin of the sea as far back as pre-glacial times. Moreover, the profiles of each stage have very low gradients by the time they reach this line, and it is arguable that the sea coast was not very much farther to the north. For these reasons, it is thought that base-level at each stage may not have been much below the heights given in the second column of the following table (heights in feet above Ordnance Datum):

River	*I*	*II*
Elwy-Aled	815	800
,, ,,	720	680
Elwy	645	620
Aled	640	620
Elwy-Aled	525	510
,, ,,	445	430

Along the coastlands of North Wales, from the Great Orme to the Vale of Clwyd, and also down the west side of the latter towards Denbigh, a number of blocks of country, separated by sharply defined valleys or lowlands, rise to heights between 400 and 750 feet. I considered it possible that in these blocks, erosion platforms closely related to the possible base-levels recorded above might be found, and accordingly the ground was examined carefully (Fig. 9). The results were disappointing in that few convincing examples of any erosion platforms could be detected. The best examples

are restricted in size. Behind Llanddulas there is one lying between 430 and 450 feet (with a partial drift cover); parts of the Great Orme are flattened at between 500 and 530 feet (note that the 25-foot form-lines of the Ordnance Survey 1:25,000 map are very inaccurate here); and behind Colwyn Bay, a long ridge is obviously bevelled at 670 to 720 feet. The latter example is one of the few cases where platforms are not cut in Carboniferous Limestone; it is in Silurian. In the Limestone areas, the effects of structure are very well marked, and in many places prominent beds can be seen clearly producing level or tilted surfaces. There is, of course, the possibility that an erosion surface may more or less coincide with one of these structural features. The general impression obtained was that a study of erosion surfaces in the coastal region of North Wales yields little definite information on any stages in the denudation.

Conclusion.—A number of stages in the development of the Elwy river system have been described. River capture and glacial interference have been primarily responsible for radical modification of an original north-flowing river system. The recognition of higher base-levels in the past is essential to any explanation of the evolution of the river

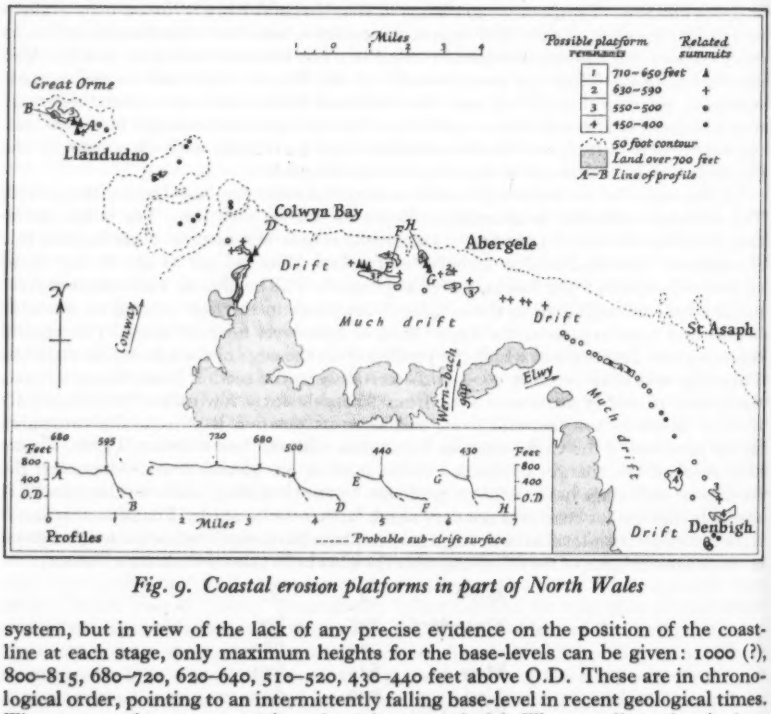

Fig. 9. Coastal erosion platforms in part of North Wales

system, but in view of the lack of any precise evidence on the position of the coastline at each stage, only maximum heights for the base-levels can be given: 1000 (?), 800–815, 680–720, 620–640, 510–520, 430–440 feet above O.D. These are in chronological order, pointing to an intermittently falling base-level in recent geological times. The 430–440 foot stage may have been just pre-glacial. The coastlines sketched on Fig. 7 are to be regarded as no more than suggestions. In a study of the Flintshire uplands on the opposite side of the Vale of Clwyd,[15] former base-levels at 620 and 520 feet were recognized, and in the Wheeler valley,[16] some evidence was obtained for later stages during which base-level (local?) in the Vale of Clwyd was at 430 and 300 feet. The correlation with Denbighshire west of the Vale is close, and supports the suggestion that, during the 520 and 430 foot stages, at least the northern part of the Vale of Clwyd was occupied by an inlet of the sea at these levels.

Apart from the discussion of the lower Elwy diversion, little comment has been made on the glaciation of the area. Study of the drift features and glacial drainage channels

of this and adjacent areas is in progress, and results will be assembled later. Only one point needs stressing here. This is the remarkable way in which certain pre-glacial land forms—especially valley benches—have survived glaciation with so little modification; in fact, obvious signs of glacial erosion are infrequent, though some of the major valleys have probably been deepened and widened by the passage of ice (*e.g.* the Cledwen valley just above Gwytherin, and the Dyffryn Gallen).

Little but speculation can be offered on the origins of the river system; nevertheless, some concluding remarks on this subject seem desirable. It has been suggested that, prior to the river diversions described, a number of generally north-flowing rivers existed. Owing to the complexity of the Silurian structures, and the fact that these rivers were flowing at considerable heights above the present land surface, it is impossible to label these original rivers as either accordant or discordant streams. Each of these possibilities, however, leads us to certain interesting conclusions.

If the original river system was discordant, superimposition is the most reasonable explanation. Suggestions of a later Mesozoic cover from which the Welsh drainage was superimposed are familiar, and various forms adopted by such cover rocks have been proposed. O. T. Jones,[17] following Lake,[18] favours a dome centred over Snowdonia; Linton[19] a generally eastward tilted surface over Wales; and Brown[20] envisages the Welsh rivers being initiated on the flanks of a dome whose centre lay well to the west of Wales. North-flowing rivers in Denbighshire, if indeed these may be regarded as the original ones, fit in better with the first and third of these concepts than with Linton's, though Brown's suggested "Elwy" and "Dulas" rivers[21] are not acceptable. If the former north-flowing rivers of Denbighshire are accepted as members of such an original superimposed river system, then the northern flanks of Jones's and Brown's dome-like uplifts would seem to have been very much steeper than the general dip of their southern or eastern flanks. Such ideas of cover rocks dipping relatively strongly to the north over Denbighshire are entirely consistent with Greenly's conception of a patch of late Mesozoic rocks on the floor of the Irish Sea north of Denbighshire.[22]

Alternatively, let us assume that the north-flowing rivers are accordant, and have developed by headward erosion from the margins of the Irish Sea basin, perhaps directed and encouraged by the NNE. to NNW. faults earlier referred to. The floor of the Irish Sea basin north of Wales is very probably underlain by Triassic and perhaps later Mesozoic rocks, and the area, like the Cheshire basin and probably Cardigan Bay,[23] represents a great hollow formed in pre-Permian times, and filled in with later sediments.[24, 25] With the gradual excavation of these sediments, drainage would develop on the flanks of the basin and, due to the relatively steep gradients involved, might have been able in time to extend itself headwards into the Welsh uplands, disrupting any existing drainage here. There are, in fact, definite signs that the watershed of the Denbighshire uplands between the drainage to the Irish Sea and that going south to the Dee, has been pushed southwards, as shown on Figs. 7*a* and 7*b*.

In our present state of knowledge of the geology and geomorphology of Wales, there is little to choose between these alternative explanations of the origin of the Denbighshire drainage. The present drainage pattern has such a long history of development behind it, and rejuvenation has been so intense in many areas, that much vital evidence has long ago been obscured or destroyed.

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STRING-BOGS IN THE ARCTIC 400 MILES NORTH OF THE TREE-LINE*

W. E. S. HENOCH

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WITH RAPIDLY EXPANDING economic activity in the Arctic and Subarctic, a knowledge of the influence of terrain, soil and vegetation characteristics on construction and communication is of increasing importance. Radforth (1959, p. 50) warns, for example, that muskeg presents such formidable difficulties to transportation that it might ". . . plunge the oil industry into a type of financing that contemporary economics will label prohibitive." Similarly, the discussion on the distribution and origin of string-bogs, especially the comments of Williams (1959) on the note of Mackay (1958), indicates the need for further study of the problem, if only because of the suggestion that they can be taken as an indication of the presence or absence of permafrost, which wrongly interpreted might have disastrous results to construction.

Drury (1956, p. 119) defines "*strangmoor*," which is synonymous with "string-bog," as "a bog on whose surface are patterns, festoons or nets of vegetation growing on mossy ridges between which are present patches of standing water or sedge meadow." On the subject of the distribution of string-bogs, Williams (1959, p. 145) relates that Troll (1944) "has pointed out that they are restricted to areas with a continental climate of only moderate cold, lying outside the region of continuous permafrost." Drury (1956, p. 52), on the basis of his observations in Eastern Canada and Alaska, agrees with Troll that: "*Strangmoor* is a phenomenon of the region just south of continuous permafrost. At least their distribution coincides with the northern edge of boreal forest, which within 200-mile limits corresponds with the limit of continuous permafrost." Hamelin (1957) finds string bogs in the Quebec-Labrador peninsula, south of the line of continuous permafrost, restricted to the zone with the southern limit of the 50th parallel and northern limit of the 55th parallel. Allington (1958, p. 91), on the basis of her studies of bogs in central Labrador, defines them as related genetically to seasonally frozen ground and not to permafrost, which in this area occurs in *palsas* only. Patterned fens, which are a form of string-bog, are described by Sjörs (1959) from the Hudson Bay lowlands where permafrost is again restricted to *palsas*. Williams (1959) supports the view of Troll, and concludes that "Mackay must be referring to different features of localized occurrence when mentioning string-bogs on Cornwallis Island."

On the other hand, ridges and hummocks described by Hanson in the Kotzebue area in Alaska appear to be similar to string-bogs and were found on permanently frozen ground with an active layer ranging in depth from 10·5 to 27 inches (1950, p. 624). The writer, while working on King William Island and Adelaide Peninsula, N.W.T., for the Geographical Branch, Department of Mines and Technical Surveys, in the summer of 1956, observed numerous staircase ponds, thrust ponds and string-bogs. Both King William Island and Adelaide Peninsula have been glaciated and subsequently submerged, the surface material reflecting this history (see Fig. 1).

The shape of the features observed on Adelaide Peninsula fits the description of most string-bogs, but in this area mineral soil is incorporated in their structure, and there were many indications that vegetation was not a prerequisite in their formation. They form a peculiar pattern which resembles fingerprints on the aerial photographs of the area. These features appear to be string-bogs, but they do not indicate areas free of permafrost, as Adelaide Peninsula lies well within the zone of continuous permafrost and about 400 miles north of the tree line. It is an area of extreme cold, with a mean annual minimum temperature of −50° F. and a mean annual precipitation of only 6

inches. In this area the depth of the active layer varies from 9 inches to 3 feet. In Plate 1 and Plate 2 are examples of patterns formed by these string-bogs which suggest the name "fingerprint-bogs."

Fingerprint-bogs in the Adelaide Peninsula area develop on flat surfaces and on gentle to moderate slopes in a surface material of fine sand, silt and clay of glacial and fluvioglacial origin. On the surface of these materials occasional shells appear, indicating marine submergence. The ridges of fingerprint-bogs may be confused with strand lines, which are very numerous in this area and are often formed of similar material, but which have somewhat different cross-profiles and, as the result of their mode of origin, are always parallel to the contours. Plate 3 illustrates one of these string-bog ridges, east of Sherman Inlet near Kettle Cove (68° 5′ N., 98° 26′ W.). The ridge is

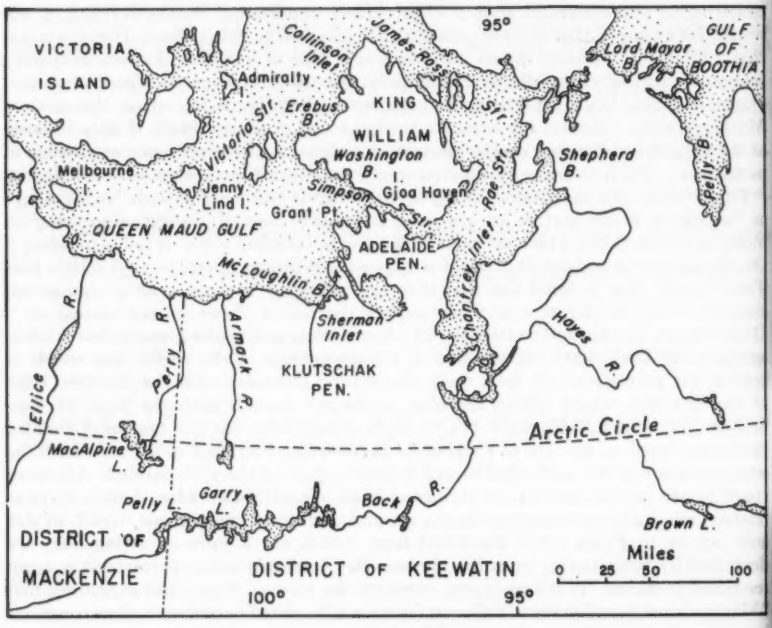
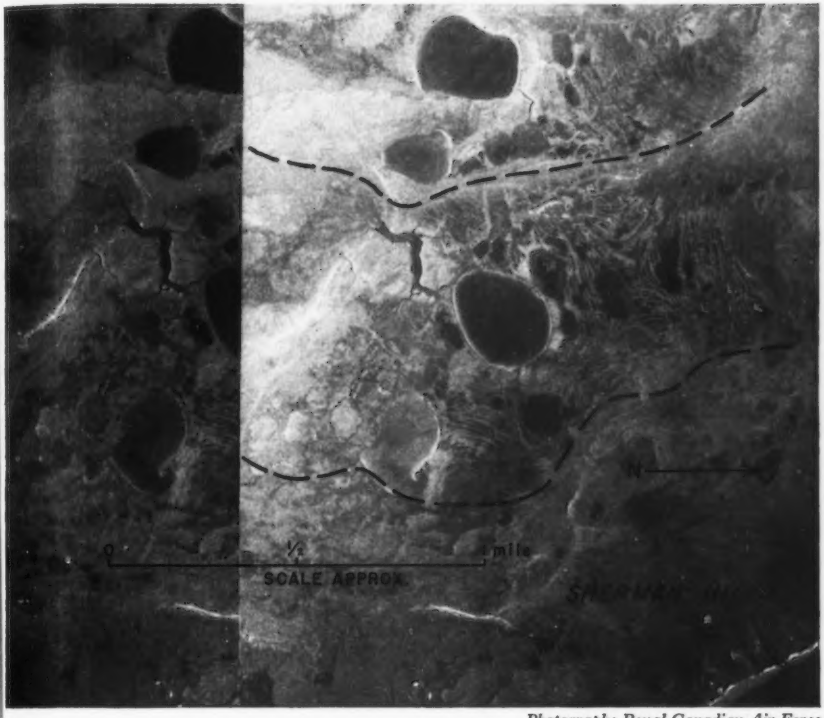


Figure 1

formed on a gentle slope, not exceeding 1 degree, on what might have been a sandy and silty pro-glacial delta. The terrain is well drained and permafrost was found in late August at a depth of 8 inches. The ridge is covered by a comparatively sparse tundra vegetation of sedges, mosses and lichens.

A photograph (Plate 4) of a similar ridge was taken west of Sherman Inlet near Ermine Harbour (67° 54′ N., 98° 14′ W.). It is developed on a steeper slope (about 5 degrees) just below the surface of a sandy outwash plain 250 feet above sea level. The ridge is covered by comparatively dense tundra vegetation and is furrowed by frost cracks. Solifluction appears to have been the main formative agent of this feature. Parallel alignment of the patterns to the contours has previously been considered as characteristic of string-bogs. Auer (1920, p. 136) states that no *strangmoor* was found whose strings did not run parallel to the contours. Williams (1959) describes them also in the same manner. This rule of parallel alignment of the patterns has many exceptions on Adelaide Peninsula. Some of these may be seen in Plate 1 and Plate 2.



Photograph: Royal Canadian Air Force

1. Finger-print pattern of a string-bog on Klutschak Peninsula, about 8 miles northwest of Ermine Harbour. Pecked line indicates the broad depression in which the string-bog appears: 22 August 1956

2. String-bog east of Sherman Inlet, about 5 miles north of Kettle Cove

Photograph: Royal Canadian Air Force

3. A simple string-bog ridge east of Sherman Inlet near Kettle Cove; 1 September 1956

Photographs: W. E. S. Henoch

4. Festoons of soil and vegetation with furrows caused by frost and solifluction. The ridges run parallel to the slope and are found just below the top of an outwash plane, about 250 feet a.s.l. near Ermine Harbour, on Silurian hills 5 miles west of Sherman Inlet

Photograph: Royal Canadian Air Force

5. String-bogs in a narrow depression north-east of Kettle Cove

The observed string-bogs on Adelaide Peninsula are best developed in depressions on a gently sloping outwash plain. Two main types of depressions, where string-bogs appear, can be distinguished in this area: (1) Narrow depressions, 200-300 feet wide, and averaging 50 feet deep, are usually well developed in stretches about ½ mile long but sometimes can be traced for several miles. String-bogs form within them on gentle to moderate slopes. A section of one of them can be seen on aerial photographs of the terrain north-east of Kettle Cove (Plate 5). (2) Broad depressions of irregular shape and relief having an average width of about 2 miles, covered with many ponds, an example of which can be observed in Plate 1 and Plate 2. The boundaries of the depressions are outlined by dashed lines. In narrow depressions the ridge pattern is parallel to the sides of the depression, thus suggesting downslope movement of the

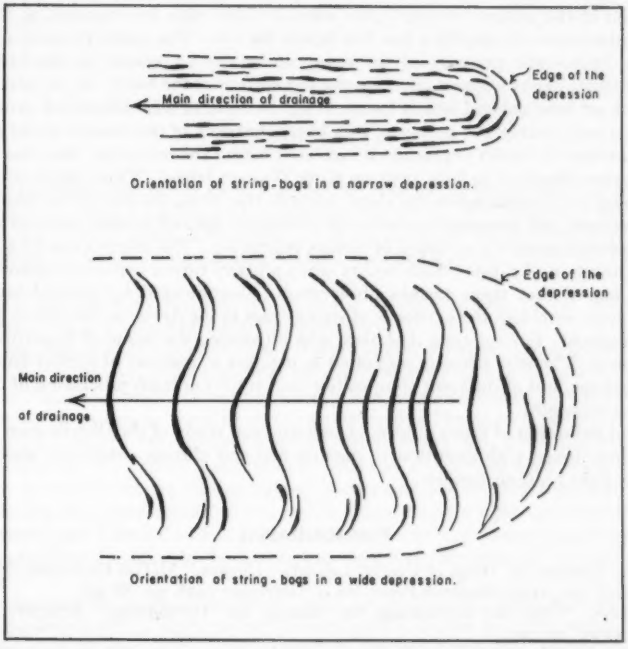

Edge of the depression
Main direction of drainage
Orientation of string-bogs in a narrow depression.
Edge of the depression
Main direction of drainage
Orientation of string-bogs in a wide depression.

Figure 2

surface material. In broad depressions, however, the pattern is often oriented across the drainage axis. The relationship of string-bog pattern and size of the depression is shown diagrammatically in Fig. 2.

A certain relationship between the slope and the size of the area appears to control the direction of movement and the orientation of the pattern. In narrow depressions, the slope of the sides determines the direction of this movement. In wide depressions the movement often appears to be directed down the general slope of the depression where the gradient may be less than that of the slope of the sides bounding the depression. Evidently, the great mass of the surface layer of the bog in the broad depressions primarily controls the movement down the general slope and makes the influence of the local slope of the sides insignificant. The string-bog ridges bend where they meet broadside such obstacles as small knolls, better drained sites or surfaces, and subsurface bedrock. Similar local topographical controls are described by Greenwood

(1957) in Somaliland. Strandlines often pass through string-bog areas, and can usually be distinguished from string-bog ridges. In some cases, the orientation of the pattern has no obvious relation to the slope, or to the dynamics of solifluction. It is possible that the pattern in this case reflects discontinuities in the physical properties of the surface material induced by conditions existing at the margin of the Pleistocene ice sheet.

The concentration of patterns around lakes is characteristic of the area under discussion (Plate 1 and Plate 2). Williams (1959) mentions two processes which might be involved in the formation of string-bogs around lakes: (1) the thrusting of lake ice in the winter and (2) hydrostatic pressure of water below the ice. Scrutiny of aerial photographs of the area adjacent to Sherman Inlet reveals the existence of lakes of several types. The two above-mentioned processes cannot be responsible for the formation of the pattern around kettle lakes or thaw lakes for example, as the water level in these lakes is usually a few feet below the rim. The radial pressure of the ice and the hydrostatic pressure of the water under the ice would be checked by the perpendicular banks without affecting the top surface of the bank. In the case of shallow lakes on level ground which freeze to the bottom, in addition to the processes of ice thrust and hydrostatic pressure, it is likely that part of the mantle under the dark but thin cover of tundra vegetation is activated before the ice on the lakes has thawed, as the writer observed in July 1956 on King William Island. Thus, when solifluction begins and is directed down the slope towards the lakes, the ice of the lakes arrests the movement and consecutive swells are formed of thawed surface material given an added cohesiveness by a covering of tundra vegetation. The process can be compared to the formation of ridges which occurs when a heavy carpet is pushed against a wall.

It is hoped that these terrain observations, documented by ground and aerial photographs, establish the existence of string-bogs in the Arctic in the area of continuous permafrost. For the type described and illustrated the name of fingerprint-bogs is proposed. The new name is suggested as it refers to features of similar appearance to string-bogs, but of different composition and resulting from processing of different formative strength.

Careful definition of types of ground patterns and study of the distribution of these types when linked with quantitative data on soil and climate conditions should help to throw light on their genesis.

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FROM THE *JOURNAL* A HUNDRED YEARS AGO

THE FOLLOWING EXTRACT is taken from the account of the presentation of the Royal Medals to Lady Franklin and to Captain Sir F. L. M'Clintock at the Annual Meeting on 28 May 1860. The extract is to be found in the *Journal of the Royal Geographical Society*, Vol. 30, pp. xcvii–xcviii. Earl de Grey and Ripon was President.

"The President then handed the Founder's Gold Medal to Sir Roderick I. Murchison, who, on behalf of Lady Franklin, replied—

" 'Connected as I have been with the Royal Geographical Society since its foundation, I can assure you, my Lord, that no event relating to our body has given me greater satisfaction than the unanimous and hearty acquiescence of the Council in the proposal which I made to them to grant our Founder's Medal to Lady Franklin.

" 'Having presided over the geographers fifteen years ago, when my dear friend Franklin last left our shores, it naturally became me, in the following years, when we began to be anxious about the fate of the *Erebus* and *Terror*, that I should advocate every search, both public and private, which might throw a light upon the voyage of those vessels; and I have thus had abundant opportunities of observing and testing the sterling qualities of a woman who has proved herself to be worthy of the admiration of mankind.

" 'Undaunted by failure after failure, through twelve long years of hope deferred did she persevere with a singleness of purpose and a sincere devotion which are truly unparalleled; and now that her own last expedition of the *Fox*, under the gallant M'Clintock, has realized the great facts that her husband had traversed wide seas unknown to all former navigators, and died in discovering a North-West Passage, then surely the adjudication to her of this Medal will be hailed by the nation, as well as by this Society, as one of the many recompenses to which the widow of the illustrious Franklin is eminently entitled.

" 'Lady Franklin's gratitude for this the highest testimonial we can offer, is thus feelingly expressed in a letter to myself, the only drawback to my reading of which is that she dwells too much on my poor though zealous services.

5, Park Place, St. James's,
May 24th, 1860.

MY DEAR SIR RODERICK,

As you were the first to communicate the great honour which has been conferred upon me by the Council of the Royal Geographical Society, and as I know you were the first to make the suggestion which was kindly and unanimously accepted by the Council, I am sure you will do me the farther favour of returning my heartfelt thanks to them.

To no one could I make this request more fitly, as it seems to me, and with more confidence, than to the faithful friend of my dear husband and myself, who, during many long years, has made the cause of the lost crews of the *Erebus* and *Terror* his own, and to whose untiring and enlightened energy, exerted in behalf of our latest, and, as it were, dying effort, the little expedition of the *Fox* has been so conspicuously indebted.

In giving expression to my natural feelings on receiving this precious Medal, you will feel assured that its chief value to me is the recognition by the most competent authorities, which it testifies to, of the life-long services of my husband in the cause of geographical research, and especially of the crowning discovery of the North-West Passage by himself and his companions, which cost them their lives.

In the contemplation of so just and so generous an act towards the dead, all personal considerations are well-nigh absorbed, yet not so entirely but that I feel deeply the great and exceptional kindness of which I have myself become the object. Disclaiming, as I must ever do, all merit for efforts which originated in the natural impulses of love and duty, and which never could have been successful without the stedfast help of all those who upheld and served me so well, I shall not the less cherish, with great pride as well as gratitude, the touching and distinguished proof so generously accorded to me of the approbation and sympathy of the Royal Geographical Society.

Believe me, dear Sir Roderick, sincerely and gratefully yours,

JANE FRANKLIN.

Sir Roderick Murchison, Vice-President of the Royal Geographical Society, &c.

" 'Breathing as this letter does the fulness of a grateful woman's heart, yet does it not give full vent to all those feelings by which Lady Franklin is animated. She has, indeed, enjoined me to say that the honour conferred upon her is vastly enhanced by knowing that she only shares in that approbation of the Geographical Society which has been and is so warmly bestowed upon Captain Sir Leopold M'Clintock and his gallant associates. A still more deeply-seated sentiment, however (as yet ungratified), is implanted in the breast of the widow of Franklin—a sentiment which was no sooner broached in the House of Commons by Sir Francis Baring than it met with general applause, and elicited the commendation of the Prime Minister and of eloquent speakers on both sides—namely, that setting aside all pecuniary reimbursement for that large expenditure of money which she could ill afford, she hopes that the Parliament will be thus far generous as to reward the officers and crew of the *Fox*, and provide for the erection of a monument to the memory of her husband and his companions in a public place, on which shall be recorded that they died in being the first to discover a North-West Passage.'"

THE NORFOLK BROADS

THE MAKING OF THE BROADS: a reconsideration of their origin in the light of new evidence. By J. M. LAMBERT, J. N. JENNINGS, C. T. SMITH, CHARLES GREEN, J. N. HUTCHINSON. Royal Geographical Society Research Series No. 3. *London: Royal Geographical Society and John Murray*, 1960. 9¾ × 7 *inches; 153 pages; maps, diagrams and plates.* 25*s*

THE BROADS ARE MAN-MADE, and are not of natural origin; this is the theme of the new publication by the Royal Geographical Society, in which a botanist, a geomorphologist, a historical geographer, an archaeologist and a civil engineer have assembled a mass of facts and drawn their conclusions from them. The Broads are peaty lakes lying in the peat-bogs of the valleys of the Rivers Yare, Bure and Waveney in Norfolk (East Anglia) and are closely connected with the river-system. They were thus not, as was generally believed up to now, formed naturally at the meeting-place of marine and riverine influences by the river-water being ponded back against deposits laid down by the encroaching sea. They are the result of the cutting of turf from about the eleventh to the thirteenth century, during a period when the land was relatively much higher than it is today and the bogs were therefore above water. The high ground in the neighbourhood was at that time thickly populated and almost treeless, so that there was great demand for fuel other than wood. Sinking of the land relative to the sea towards the end of the thirteenth century resulted in flooding of the pits where dry turf-cutting must have taken place, and the abandonment of turf-digging. Apart from a few references in old documents, the memory of this industry has since been completely lost. The book under review brings this period to light once again and explains many features in the landscape which had previously seemed obscure or had been interpreted differently.

This book is important not only for its main theme; the facts produced have great documentary value in themselves. The stratigraphy of the organic and inorganic deposits, which has been analysed in the careful borings (over 2000) made by Lambert and Jennings and their helpers (who included students), is now available in a clear well-documented form, and is accessible to all. The same applies to C. T. Smith's survey of the history of human habitation in the area and its connection with the sites and names of the villages and towns.

The data and the explanations given by Green and Hutchinson, particularly with regard to fluctuations in the relative levels of the land and the sea, are also worthy of attention and will be very important for further research. Detailed references to the literature increase the documentary value of these chapters. A large number of maps, sections and good photographs help to explain the text, or have documentary value of their own. (The general use of the decimal system to indicate measurements also makes the argument easier to follow for continental readers.)

A publication of this sort is not only of great interest to those who live in, or who love, the area, but as a study of an alluvial coastal area it is of value to everyone interested in the geomorphology and geography of similar regions, and is of world-wide interest, since the oceans wash every shore.

This applies particularly to those whose lives are largely bound up with such a region, since many of their villages and large towns are built on the same low-lying, waterlogged, peaty and clayey Holocene deposits, and these villages survive by virtue of the measure of man's success in checking the relative rise in the level of the sea by raising the height of the dikes. This is precisely the position of the inhabitants of the western and northern part of the Netherlands, and those of them who are interested in geography look to the east of Britain as a mirror in which the North Sea is bound to produce effects similar to those on its eastern shore. 'The making of the Broads' can be regarded as a pair of spectacles through which we can take a look at this mirror. We see

resemblances, and where there are disparities we ask ourselves whether the spectacles have perhaps some distorting effect, or whether our own spectacles might not have been properly in focus during investigations on this side of the water, or again whether the mirror is producing an optical illusion and the "reflected" image ought in fact to be different. Thus the main conclusion that the Broads are man-made is not so striking for Dutchmen who live, work and sail for pleasure among and on similar lakes, which in some places still yield turf and which only a few centuries ago were spreading as a result of wind erosion and threatening cities, such as Amsterdam, with destruction. This conclusion had already been suggested by air photographs in earlier publications by some of the authors, which clearly showed the presence of the remains of balks or ridges. But in the Netherlands also there are lakes ("meren") which are older than the "turf-pit" lakes ("plassen") and whose origin is still uncertain, although it must be admitted that their expansion as a result of wind erosion was a consequence of factors which included human agency. This detailed investigation of the Broads and conclusive proof of their non-natural origin is, therefore, also important on this side of the North Sea.

There are, however, notable differences. Cutting of turf for fuel took place here mainly in the *Sphagnum* peat, which had filled the centres of the lagoons in the Subboreal period. Brushwood peat was cut only secondarily; and even today it is not used for fuel, but for other purposes. The absence of moss peat could be the reason for making do with less suitable material. An important factor is also that the concentration of silt in Norfolk peat must have been lower (as in our analogous peats). Or did the centres (which have now completely vanished) consist of *Sphagnum*? (This latest supposition is not very likely.) In addition, we do not now have (in the Netherlands) any lakes with growing peat, connected to rivers. Perhaps after the completion of the Delta Plan there will be formed organic accretions, similar to those described by Lambert and Jennings—which are so important for the origin of the Low Countries—in the fresh-water tidal areas of the Rhine and Maas where the tidal range will be sharply reduced. Here it is still inorganic sedimentation which is dominant.

The conclusion on the relative movement of the sea level, particularly with regard to the very high level of the land above the sea (four metres higher than today), at about the time when the Broads were formed, deserves attention. It is a pity that, for instance, the results of the Symposium on Land Submergence with particular reference to the Netherlands, published in *Geologie en Mijnbouw*, new series, **16** (1954), had not reached the far side of the North Sea when this book was being written. There is agreement on various points, but disagreement on others. The conclusion that the water levels were relatively low 700 years ago (four metres lower than at present), which is based mainly on the presence of beds of barnacles (*Balanus balanoides*) and mussels (*Mytilus edulis*), implies that the absolute movement of the land must be far greater than that of the sea. This could be a very interesting fact, but further research will be required to show whether this is caused by a distortion in the "spectacles" or in the "reflected" image. Green and Hutchinson's picture of the hydrographical history of Broadland is closely bound up with this view, although it appears that the main conclusions could still stand even if a less extreme influence is attributed to the absolute movement of the land. The value which this book possesses as sheer documentation, and as an example of extensive geographical research involving many aspects of the countryside in time and space, is increased by the more detailed investigations it will stimulate on both sides of the North Sea and elsewhere. It will certainly encourage Dutch and perhaps other investigators in the field of geography and related sciences to visit Broadland and to see its beauties on the spot with their own eyes, using their own "spectacles."

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REVIEWS

EUROPE

THE MAJOR LAND USES OF GREAT BRITAIN. By R. H. BEST. *Studies in Rural Land Use* 4 (1959). *Wye College, Ashford, Kent.* $8\frac{1}{2} \times 4\frac{1}{2}$ *inches; 113 pages; sketch-maps, diagrams.* 10*s* 6*d*

AGRICULTURE AND URBAN GROWTH. By G. P. WIBBERLEY. *London: Michael Joseph, 1959.* $8\frac{1}{2} \times 5\frac{1}{2}$ *inches; 240 pages; diagrams and illustrations.* 21*s*

The first clear duty of a reviewer of 'The major land uses of Great Britain' is to say that rarely has so much hard work been presented with such sound commonsense. And more—though conclusions are presented, they are given on a solid basis of factual enquiry, with the sedulous avoidance of journalistic cries of the "new towns to starve in" variety. As so much of the literature concerned with planning has still not advanced beyond a polemic stage, this in itself is an achievement.

Mr. Best, already known for a number of articles and for his lively earlier monograph on 'The garden controversy' (No. 2 in the same series with J. T. Ward as joint author), here inquires what exactly is done with the land surface of Great Britain. He uses the statistics of the Ministry of Agriculture, Fisheries and Food, and of the Land Utilisation Survey, with supplementary sources such as those of the Ministry of Housing and Local Government. And these sources are especially important for a survey of urban areas: ". . . although," says Mr. Best, "the data now available from Development Plans are incomplete . . . the material is nevertheless extensive enough (with additional information from county planning authorities) to allow estimates to be made of the total size of the urban area in this country and of its component parts." As in the nineteen-thirties the estimate of urban land of the Ministry was 4,162,000 acres and of the Land Utilisation Survey, 2,748,000 acres, some further investigation was necessary. By various lines of inquiry, Mr. Best estimates that the urban area increased from 2,000,000 acres in 1900 to 3,600,000 acres in 1950; that is, from 5·4 per cent. to 9·7 per cent. of the total area of England and Wales. The most curious feature of the statistics is the decline of the area "unaccounted for" from 5·9 per cent. in 1900 to 3·3 per cent. in 1950, largely because when feedstuffs were rationed in 1941 much agricultural land was officially recorded for the first time. With great ingenuity, Mr. Best traces the changes in land use from 1927–1939, 1939–1945 and 1945–1948: he finds that the average loss of farmland for the twelve years before the 1939–45 war was nearly 64,000 acres of which, however, some was allocated to allotments, sports grounds and forestry rather than to building. During the nineteen-fifties, the net loss for building, sports grounds and constructional work was approximately 50 square miles a year, less apparently than before the war.

This work is part of the foundation on which Dr. Wibberley builds his excellent general survey. The essential problem is that England and Wales now has twice as many dwellings as in 1901, and 32 per cent. more than in 1931, though the increase of population from 1931–51 was less than 5 per cent.; clearly a loss of agricultural land was inevitable unless people were to be housed in skyscrapers. Dr. Wibberley enquires how such loss could be offset by gains elsewhere, and shows that whereas in 1936–9 100 acres of crops and grass fed 54 persons, in 1949–50 the same area fed 78 persons. And where can new land be found? The author explores the possible returns from improvement of upland areas, so long advocated by Stapledon and others, of foreshores and salt marshes such as Morecambe Bay and the Wash, of land amenable to drainage improvement, and of many areas of poor soil such as sandy heaths of Sherwood and the New Forest. He is a strong advocate of the transformation of patches of derelict woodlands covering a few acres here and there throughout the country, not unusually on quite good land. According to the calculations, much of the reclamation

from mineral workings is very expensive and there is a net loss of some 3500 acres a year; Dr. Wibberley notes that the surface working of minerals increased three to four times from 1922–37, and more than doubled in the next fifteen years. He apparently recognizes that, as another geographer said, "we must live with our minerals"—at least we cannot now live without sand, gravel, lime, china clay and ironstone even if opencast coal is no longer needed.

Town expansion is a world problem. New York adds to itself 50 square miles a year, as much as all the new building everywhere in England and Wales, but how? In America much of the land near cities is so expensive that no one will buy it, and therefore people settle farther out and, with fast cars on super-highways, travel as much as fifty miles to work. In 1957, there were 13,000,000 lots vacant for building in the U.S.A. awaiting purchasers, though only one million were needed annually. Some take a poor farm of 160 acres, live in it, farm only a field or two and allow all the rest to revert to scrub or woodland. Of course, there is so much more of America than of Britain, but even so, by 1975 it is estimated that 11 per cent. of its area will be in urban use, which is almost exactly the proportion of England and Wales likely to be so used at that time. But enough has been said, perhaps, to make readers study these works for themselves and to make clear their intrinsic merit. T. W. FREEMAN

NORTH ENGLAND. By A. E. SMAILES. Regions of the British Isles series. *London and Edinburgh: Nelson*, 1959. $9\frac{1}{2} \times 6$ *inches;* 324 *pages; plates, figures, map.* 50*s*

The neglected craft of the regional study of Britain's geography is worthily revived and given a traditional face in the first volume of a definitive series on the British Isles. This balanced assessment of a most varied territory brings a flavour of the classical French school of regional work, well-written description with a measure of subjective interpretation taking the place of the impersonal and ponderous analysis of much contemporary, jargon-ridden geography. The argument reveals the past and present personality substantially of the four northern counties and is at once lucid and admirably buttressed by a nigh faultless wealth of fact and reference. A textbook in content, its appeal will be to an audience wider than that of geographers in education and should include all laymen who love the North Country and live or work there.

Apart from the first quarter, an evaluation of physical conditions, the book falls into two parts of equivalent length: the development of human geography through successive historical tableaus to modern times, treated systematically; and an interpretation of the constituent sub-regions of North England, each in its distinctive setting, individual landscapes, economy and society. Landscape is the blackcloth against which the changing regional geography is high-lighted.

Students of the contemporary economic scene, focusing on the nature of current problems, the decline of the coalfield margins, the decay of rural areas or the lack of sufficient diversity in the region's industrial structure, will find these and similar interests under-represented in a book with a somewhat detached and long-term viewpoint. The statistical framework, notably on the peopling and change in distribution of the population during this century, is as sparse and scattered as it has regrettably but traditionally long been in the French school of regional study, to which this otherwise admirable book is such a praiseworthy heir. J. W. HOUSE

THE PLACE-NAMES OF DERBYSHIRE. By KENNETH CAMERON. English Place-Name Society, Vols. XXVII–XXIX. *Cambridge University Press*, 1959. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* 830 *pages; maps.* 35*s*

The volumes of the English Place-Name Society are of value to the geographer in two ways. The main part of any of the county volumes, the actual discussion of individual names, is of greatest use to those concerned with detailed regional studies; the introductory section, dealing with the distribution of different elements within the county, is of immediate use to all historical geographers. This is because place-names constitute one of the main sources of evidence for the sequence of the Anglo-Saxon colonization of this country. Every additional volume is welcome, since county by

county a fuller picture of the colonization and of the subsequent growth of the English kingdoms is being built up.

In the Derbyshire volumes the place-name evidence is interpreted as showing the entry into the county of Anglian settlers in the late sixth and early seventh centuries. These settlers came by way of the Trent valley and penetrated into upland Derbyshire by way of the Derwent valley. The Derbyshire evidence accords with that of the Nottinghamshire volumes, already published, and we must await with interest the publication of the Staffordshire volumes to gain a fuller knowledge of the whole of the upper Trent. The place-name evidence from the Carboniferous Limestone outcrops in Staffordshire will be particularly interesting, since on the Derbyshire outcrops of the same formation no pre-English names survive. In Staffordshire the tumuli of the Carboniferous Limestone outcrop yielded artifacts from the Bronze Age and from subsequent periods, including finds associated with Anglian secondary burials. These good lands had been cleared and as such attracted the Anglians; what happened to the previous occupants? It is significant that the largest group of Celtic place-names in Derbyshire survive farther north on the much less hospitable areas of the Millstone Grit formation. The conquerors took the best available.

Valuable though they are, the value of these introductory sections could be increased if the illustrative maps provided some means of comparing the distribution of different elements with the relief and/or the geology, especially if this could be extended a little beyond the county boundary. In the notes dealing with lost sites it is stated: "We are dealing primarily with names." This is, of course, true but many of the readers of these volumes are equally concerned with places and, if their needs can be met with little extra labour or cost, it is all to the good. E. M. YATES

LOCAL HISTORY IN ENGLAND. By W. G. HOSKINS. *London: Longmans*, 1960. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* 196 *pages; plates and maps.* 21*s*

There is an increasing interest in local history, and this book has been written to give "advice and guidance to all those who are studying local history and topography anywhere in England, especially those who are hoping to produce their own history of a particular place." Dr. Hoskins modestly asserts that his work is not intended to be a complete guide to the sources available for the writer of local history, but he does, in fact, give numerous references to help students interested in almost any branch of this large subject except prehistoric archaeology. He also excludes the local history of Wales and London from consideration. The author continually lays emphasis on the importance of old maps as a source for local historians. He calls special attention to the value of the Ordnance Survey maps of English towns on the very large scale of 1:500 which were made in the later decades of the nineteenth century. Among the many specialized tasks which local historians might be encouraged to undertake, Dr. Hoskins suggests that the compilation of complete catalogues of maps of selected areas would be particularly useful. The book includes two valuable chapters of advice on the study of towns and these are matched by two chapters on field-work. A geographer might well complain that Dr. Hoskins is not very precise in his use of the word "topography," but this is a small criticism to place against the value of his book as a whole. It will be an invaluable aid to the great army of amateurs who now work in the field of local history. E. W. GILBERT

A REGIONAL GEOGRAPHY OF WESTERN EUROPE. By F. J. MONKHOUSE. *London: Longmans*, 1960. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* 726 *pages; maps, diagrams and plates.* 50*s*

Since the only parts of Europe dealt with in this book are France and the Benelux countries, the title 'Western Europe' is certainly misleading. The boundaries of Western Europe are indeed too indefinite to be defined except by subjective preference, but the omission of Spain and Portugal, Denmark and Norway, and the British Isles can hardly be excused by the promise of their future treatment by a colleague. With the book itself, however, there is little fault to find. The treatment is regional, the four countries dealt with being regarded as a single geographical unit and divided into

regions according to physical and human characteristics. There is complete disregard of political frontiers. Thus, "Maritime Flanders" includes parts of the Netherlands, Belgium and France. The regions are then grouped according to broader features, and each group placed in a separate "Part." Part I deals with the lowlands, Part II with the Hercynian uplands and Part III with the fold mountains. This regional treatment emphasizes the influence of the physical background on the life of the people. The description of the regions goes into great detail. The author, who tells us in his foreword that he has towed his caravan all over the area, is clearly familiar with most of the country, though he also gives proof of extensive reading. His descriptions are those of the trained geographer and competent observer who has eyes to see the country and its activities.

In presenting the reader with a picture of the countries he describes he offers a good mixture of human (including economic) geography with the physical factors that influence man and his work and life. The Netherlands and Belgium are especially well treated, so much so indeed as to suggest a particular liking in the author for those countries. In viewing his landscapes his eyes rest equally on the ancient castle or the still more ancient settlement on the one hand, and on the other the *vins fins de Bourgogne* or on even the modern Dunlop rubber factory. The whole is illustrated by a number of excellent sketch-maps and aerial photographs. Altogether, the work is a worthy member of Longmans' "Geographies for advanced study." Of course, there are flaws, but very few. It seems pedantic to eschew the familiar Campine and to substitute the less known Dutch Kempen, and it is unnecessary to recite linguistic variants on place-names (Antwerp—Antwerpen—Anvers). E. D. LABORDE

LES PAYS CRÉTACES BASCO-CANTABRIQUES (Espagne). By PIERRE RAT. Publications de l'Université de Dijon, XVIII. *Paris: Presses Universitaires de France*, 1959. 10×6½ *inches;* 525 *pages; maps and plates*

HOMENAJE A D. JOAQUIN MENDIZABAL GORTAZAR, Conde de Peñaflorida (1886–1954). Grupo de Ciencias Naturales "Aranzadi": Real Sociedad Vascongada de Amigos del Pais, Publicación no 12. *San Sebastian: Museo de San Telmo*, 1956. 9½×6½ *inches;* 505 *pages; maps, diagrams, plates*

LE PROBLÈME DE LA LIMITE GÉOGRAPHIQUE OCCIDENTALE DES PYRÉNÉES. By JEAN SERMET. Extrait des Mémoires de l'Académie des Sciences, Inscriptions et Belles Lettres de Toulouse: XIIIe série, tome IX, 1958. 9¼×6¼ *inches;* 144 *pages; maps and plates*

The first of these works is a very careful stratigraphical and structural study of the northern part (to about the latitude of Vitoria) of the area intermediate between the exposed Hercynian masses of Cantabria and the Pyrenees. It is, as one would expect, a valuable document for the relations between the Tertiary mountains associated with these masses.

As the title suggests, the Cretaceous predominates, but an adequate picture is given of the whole changing palaeogeography from the Permo-Trias to the mid-Eocene with which the record closes.

Until the Albian stratigraphical dependence on the west and south-west is complete —the area entering then first into the Pyrenean domain—maximum subsidence, never exceeding 3000 m., shifts correspondingly from west to east. For the earlier period, the paradoxical appearance among masses of terrigeneous material of the very pure compact limestones of the "Urgonian complex," with "biofacies characterized by Rudistes gravitating round *Toucasia*," is very fully discussed in sections which are probably the most valuable in the book for the geologist.

These limestones, sometimes as "hanging karsts," provide the boldest reliefs, the "Northern Gibraltar" at Santoña *e.g.*, and are the stiffening element, with the help of "Supra-Urgonian" grits, in the main anticlinals. In the north-west only, these follow Cantabrian E.–W. trend-lines, the pattern changing abruptly on the meridian of Valmaseda, as near the Pisuerga in the area to the south, to the NW.–SE. (sometimes WNW.–ESE.) lines followed by two anticlinal zones, a southern running for 100 kilo-

metres from near Bilbao to the Aitzgorri, and a northern, from Cabo Villano to Tolosa. Between these, a "Synclinorium" of the flysch characteristic of the north-east rises in a narrow band to the Eocene perched synclinal of Oiz, and carries fields of eruptive rocks.

Some of the lines in the pattern, though primarily belonging to the Tertiary orogenesis, are related also to precursory movements in the Hercynian substructure conditioning the stratigraphy, notably the line running south-east from Valmaseda marking a flexure thought to have played a part from epoch to epoch; today it is a divide separating NE.-directed from SW.-directed movements, and introducing a simpler structural style in the southern cuestas and monoclines of the Turonian and later formations. Across this line runs obliquely, from Murguía to Guernica, a line of secondary upfolding, important from the Turonian at least, which raised the Gorbea massif to be the highest in Vizcaya. Towards the "sort of flexure" occupied by the Oria, the intensity of Tertiary action increases, with closer NE.-directed folding near the Aitzgorri, and movements in the Ernio and Pagoeta folds of the North which provide the only *klippe* of the volume and a rotational phenomenon of possible significance.

At the Oria there is a palpable curvature or flexure, concave northwards, of the trend-lines, but evidence of stratigraphical and structural continuity at special points (pp. 477f., 486) leads to the suggestion that, if this overrides the general difference of trend, the Pyrenees may be taken as continuing by the Synclinorium and the northern anticlinal zone to end with them in the sea to the north of Bilbao. The southern anticlinal zone may be taken similarly to continue the Sierra de Aralar, but there is no question of continuity in the north-west where its folds collide (p. 403) with the folds of Santander.

The author, seeing surface phenomena always in terms of substructure, and following precedent in connecting the south with a southern fork of the "Asturian" mass because of its greater stability, indicated by the structural style, and its S.-directed movement, is obliged to separate from it, as connected with a Pyrenean mass, the parallel Bilbao-Aitzgorri zone. His last word on the question of mountain boundaries is that two "blocks," an "Asturian" and a "Pyrenean," are stuck together (*accolés*) along the border of this zone.

Mention must be made here of the excellent plan by which the dentritic Permo-Trias and the Keuper are shewn separately on the map, bringing out clearly the importance of the Keuper diapirs (domes) and their relation to tectonic lines. The role of the Keuper marls and other mobile formations in providing gliding planes and otherwise is noted in the text.

In the second volume under review, among the papers offered in memory of a distinguished Basque geologist, there are a number throwing light on the geography of the whole region. R. Ciry writes as geologist of the Losas, south of the divide spoken of above and, in particular, of the great cuesta scarped magnificently for 70 kilometres towards the Valley of Mena and then to the NE. J. Hazera speaks of the Lower Nervión, from the mid-Quaternary onwards, and delimits the Flandrian *schorre* of today. P. Lamare, justifying apparent vagaries of the international frontier in the Basque Pyrenees, sums up significantly: "the frontier line . . . broadly speaking, separates . . . two territories whose essential tectonic characters are quite appreciably different." N. Llopis Lladó shares a description of a living karst in the flysch near Rentería. Two papers, though primarily archaeological, should interest the geographer: "Dolmen y caserío" by J. M. Hernández, and a paper by M. Laborde on the origin of iron-working in Guipúzcoa.

It remains to notice the contribution of J. Sermet and his separate brochure, which inform us of much work inaccessible to the British geographer. Wide reading and the observations of thirty years in the Vascongadas mark his characterizations of their *Haut Pays* (Alava) and *Bas Pays* (Guipúzcoa and Vizcaya), fundamentally different, yet "two parts of a single *ensemble*, not two distinct *ensembles*."

Most illuminating are the observations of the differing morphology of the two northern provinces, suggested first by the appearance in Guipúzcoa alone of planated

and other older surfaces, used to advantage in modern routes. Ultimately this may be due to the decrease from east to west in epeirogenic action, to the advantage of the Guipúzcoan rivers, which have superimposed transverse courses on the structure, a relief in "quadrillage" resulting[1]; whereas Vizcaya, with the original structure largely conserved, is bound within the pattern of its synclinal valleys, the Nervión valley, broad and low almost to the source, being an unexplained anomaly. Despite appearances, Guipúzcoa is the opener, better "aerated" province.

The purpose of the brochure is primarily to appeal against the decision taken in favour of a single Pyreneo-Cantabrian system "*de domaine pyrénéen*" extending to Galicia, at a sectional meeting of the 1st International Congress of Pyreneists (1950), by a majority made up mainly of geologists. Witnesses for the appellant include both the geologists most familiar with the Basque area and the common man, whose criteria for *pays* and *comarcas* have high validity, the two classes agreeing that the Vascongadas are not Pyrenean; the geologists take as boundary the line of the Oria-Idiazabal, leaving outside the coastal flysch corridor and Eocene chain ending at Cabo Higuer. Even taking the narrowly physical, rather than the regional, view of mountains, the case seems made out against continuing the Pyrenees by this northern line.

In the matter of relationship with S. Pyrenean folds, the author speaks with less certain voice. But his tentative suggestion (p. 142) should not be overlooked, of a "coupure cardinale" ending the "Cantabrian world" at a N.–S. line of transverse folding marked by a major diapir (Estella) and by a dead end in the outer sierras (Codés, just outside Alava). Nor should the parallel be missed (though not drawn) between the flexure introducing the changes of pattern mentioned on p. 346 above and that by which the E.–W. trends of Navarra give place to Aragonese trends controlled by an "*Armorican, or almost*" (reviewer's italics) substructure (p. 139).

On the general question one must sympathize with the view that a geographer should not be bound by the criteria laid down for the mountain system (p. 105; note the absence of Stille's common foreland). Even apart from the lack, for the human geography, of continuity of culture from Galicia to Cabo de Creus, there are difficulties, depending ultimately on stratigraphical differences, confronting the physical geographer for the acceptance of the typical morphology of the west as Pyrenean in any sense, the case of the "Mountain Limestone" being an admirable illustration.

ROBERT AITKEN

NIVEAUX OPTIMA DES VILLES: essai de définition d'après l'analyse des structures urbaines du Nord et du Pas-de-Calais. By A. VAKILI, P. PINCHEMEL and J. GOZZI. Comité d'Études Régionales Économiques et Sociales. *Lille: C.E.R.E.S.*, 1959. 9½×12 *inches; 118 pages; diagrams and tables*

Here is a valuable and detailed work of urban geography and urban planning which is likely to suffer because of its cumbersome title. This is particularly unfortunate because the facts of the urban geography of the Nord region (*i.e.* the departments of Nord and Pas-de-Calais) by Professeur Pinchemel are carefully separated from the second and third parts of the text written largely by A. Vakili, a research economist. The opening monograph is important because in this region three out of every four inhabitants reside in an urban commune. Yet it is possible to distinguish an area almost totally urbanized from one which has remained quite rural. In these rural zones of the west and south of the region, the towns serve as regional centres for separate rural areas; consequently, they have important numbers of their inhabitants in "tertiary" occupations. But in the heavily urbanized north and east the towns are almost continuous, having few contacts with rural zones; there is much less development of tertiary service functions.

Because of the existence within the region of towns of many sizes and many types, it has been thought worth while to suggest "optimum levels" for town growth, and this is the burden of the rest of the text. The general conclusion is that it is better

[1] v. P. Lamare, 'Les montagnes basques,' *Pirineos*, XII, 1956, for "quadrillage" of Navarra (p. 32) and the "chemin des crêtes" (p. 37). *Pirineos* is available in the Society's library.

to have one large city, of about 400,000 people, and a network of small towns, of 30,000, rather than towns of intermediate size. The value of the work lies not so much in the novelty of this conclusion as in the wealth of material from which it has been derived. However, many of the maps lack a scale and one searches in vain for details of physical geography. It is regrettable that the growth of towns has generally been considered without much reference to their physical sites and situations. JAMES BIRD

THE INDIVIDUALITY OF PORTUGAL: a study in historical-political geography. By DAN STANISLAWSKI. *Austin: University of Texas Press; Edinburgh: Thomas Nelson*, 1959. $9\frac{1}{2} \times 6\frac{1}{4}$ *inches; 217 pages; maps and plates.* 30*s*

The first four chapters of this useful and readable book deal adequately with the morphology, climate, soils and vegetation regions of the country, and show clearly how these have influenced the development of Portugal within her natural boundaries. The subsequent chapters indicate the historical sequence which has resulted from this geographical environment. Professor Stanislawski's summary is based on an extensive study of Portuguese and Spanish authorities, such as Professor Orlando Ribeiro, supplemented by his own field work. He discusses at some length the problem of the prehistoric immigrants of the Iberian Peninsula, though without reaching any very definite conclusions, and solves the mystery of the Celtiberians by identifying them with the Belgae (p. 83). The dissected uplands north of the Mondego, with their fertile valleys and heavy rainfall, attracted the settlement of the agricultural Suabians in the fifth century A.D., while the pastoral Visigoths, from their more eastern homeland in Central Europe, preferred the wider spaces of the Alentejo and the Spanish *meseta*. Again, in the eighth century, the Moslem invaders never sought to settle north of the Douro, finding the drier and warmer region south of the Tagus more congenial to their way of life.

The author gives a clear picture of the origin and establishment of Portuguese independence from the other kindred kingdoms of the Iberian Peninsula, but he hardly stresses sufficiently the geographical contrast between the arid plateau of León and the westward-facing rain-drenched valleys of Trás-os-Montes and Beira; he does, however, clearly indicate the physical barrier which divides Galicia from North Portugal. The maps and photographs are clear and helpful, except that the first map (Fig. 1) shows the Spanish frontier wrongly as following the Guadiana River uninterruptedly from near Elvas to the sea, a mistake fortunately not repeated in the other maps. The book closes with a valuable bibliography of ten pages.

JAMES MARSHALL-CORNWALL

THE EVOLUTION OF THE RURAL LAND USE PATTERN IN CYPRUS. By DEMETRIOS CHRISTODOULOU, with land use map on scale of 1:253,440 prepared by R. R. RAWSON and K. R. SEALY. Monograph 2, Land Use Survey, edited by L. DUDLEY STAMP. *Bude: Geographical Publications*, 1960. $10 \times 8\frac{1}{2}$ *inches; 230 pages.* 25*s*

This, the second regional monograph to be published by the World Land Use Survey, is the result of a long period of careful field-work by its author, Dr. Christodoulou. Many problems had to be confronted, from the scattered and fragmentary statistics, to the general lack of facilities for research. Most important, too, is the fact that Cyprus is an island where human occupation has been long and sustained. This last fact sets the author a formidable task, and it is greatly to his credit that he has not shirked the need to relate his material to the historical background. The use and misuse of the land is a thread that permeates the whole life of the island, and there is much to be learnt from this account of the constant struggles of the peasant communities against both a harsh physical environment and economical and social restrictions. In detail, the first five chapters are devoted to the physical background, while the succeeding five deal with the people, settlements, land tenure and related topics. Nine chapters cover the various aspects of land use, and the concluding chapter presents a synthesis of the whole work in terms of land use regions. The work is illustrated throughout by

tables and clear, well-drawn maps. The 1:253,440 land use map that accompanies the memoir, first published in 1956 (reviewed in this *Journal* in December 1957), now takes its proper place in the whole project. This is a reference work of great value to the geographer, to the planner and to those who are in any way concerned with the progress and well-being of Cyprus. K. R. SEALY

ASIA

THE DEVELOPMENT OF HONG KONG AS TOLD IN MAPS. By T. R. TREGEAR and L. BERRY. *Hong Kong University Press*, 1959. 11×8½ *inches;* 31 *pages; maps.* 10*s*

Captain Elliott obtained the cession of Hong Kong to Britain in 1841; and for his pains was dismissed from his post by Palmerston—who scathingly remarked that Elliott had merely "obtained the cession of Hong Kong, a barren island with scarcely a house upon it." The maps in this little publication tell how this barren island and the adjacent mainland became the present densely-peopled settlement. The maps and the accompanying text show, amongst other things, what an important part has been played in Hong Kong by reclamation from the sea; and they in fact take the story back beyond Palmerston's "barren island," for Map 2 shows a most interesting coastal pattern of prehistoric sites presumably occupied by pre-Chinese peoples (Chinese agricultural settlement, rather surprisingly, only began here in the twelfth century A.D.).

The maps and the accompanying story will fascinate many people, but they will be most useful in Hong Kong itself, for the liberal use of place-names not shown on any map presupposes local knowledge. There is some inconsistency in spelling place-names, and the maps could have been more legibly reproduced. But these criticisms are not very weighty; one's final impression is of work well done and of a vast amount of material collected and summed up in maps. B. H. FARMER

THE INDIAN JUTE BELT. By P. SENGUPTA. *Calcutta: Orient Longmans*, 1959. 7×9½ *inches;* viii+152 *pages; diagrams, illustrations and maps. Rs* 20.00

BOMBAY GEOGRAPHICAL MAGAZINE: LAND USE SPECIAL. Vols. VI-VII, No. 1, September 1959. *Bombay: Bombay Geographical Association.* 112 *pages; diagrams, illustrations and maps*

Definitive works by geographers on Indian agriculture are very rare indeed and, to the best of the reviewer's knowledge, Miss Sengupta's book is the first to succeed Miss Ethel Simkins's classic study on 'The agricultural geography of the Deccan Plateau of India' written some twenty-four years ago. It is also the first full-scale geographical study of a single Indian crop. The attitude adopted by the author toward her analysis is the classic one of presenting the problem in its environmental setting, and over half the book dwells upon this aspect of jute cultivation. Miss Sengupta has, moreover, attempted to make precise measurements of the environmental influence by means of advanced statistical techniques derived from John C. Weaver's early work on barley. Her results do a great deal to deepen her descriptive analyses and lend authority to her conclusions as to the marginal position of India as a major producer of jute, especially when compared to an optimum set of factors derived from a comparative study of jute cultivation the world over. The remaining sections of the book deal principally with a geographical analysis of production cost, price and profit, and with what the author calls, "the jute belt farm." The use of the term "farm" to describe what is after all a small holding is misleading; and although a good general description of the agricultural system is given, genuine case studies are absent and too great a reliance is placed upon secondary sources. Taken as a whole, this book is a valuable contribution to Indian agricultural studies and, with its excellent layout, maps, diagrams and illustrations, and its novel approach to the physical factors of jute cultivation, deserves wide reading.

The second work under review is largely the outcome of the 1959 meeting of the recently founded Indian Council of Geographers at Delhi. The Bombay Geographical

Society is to be congratulated on publishing many of the papers on land use presented at this meeting. Most of the studies now presented are, in relation to the area of India as a whole, small-scale in stature; but they are all the result of work in the field and witness the increasing tendency among Indian geographers to move away from secondary sources. In this issue a wide variety of topics are discussed, from land use in Greater Bombay to rural land use. Geographers in this country will appreciate Dr. A. T. A. Learmonth's frank description of his own contribution to the Mysore State Pilot Project in Regional Survey and the problems he encountered.

MARTYN J. WEBB

MAN IN MALAYA. By B. W. HODDER. *London: University of London Press*, 1959. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches; 144 pages; maps, diagrams and plates.* 12*s* 6*d*

This is a very readable little book, noteworthy for the avoidance of jargon where others have fallen into it. Its purpose for geographers, Mr. Hodder says, is to supplement previous regional studies, "not to provide a comprehensive geography of the peninsula" (p. 7). After a brief physical introduction, he moves on to discuss settlement, economic life, the Malayan plural society, climate and man, water supply, soil erosion, and health, disease and diet. He does not altogether succeed in coordinating his many very diverse sections, and there are occasional oddities and solecisms (thus we read on p. 14 of "non-alluvial plateaus," whatever they may be, and there is a mathematical fallacy on pp. 75–6). But, looking back on the book as a whole, two impressions predominate: the book reads well and easily, and it succeeds in treating people as people, and not as mere dots on a map.

B. H. FARMER

AFRICA

AFRICA—ITS PEOPLES AND THEIR CULTURE HISTORY. By GEORGE PETER MURDOCK. *London: McGraw-Hill*, 1960. $8\frac{3}{4} \times 6\frac{3}{4}$ *inches; 456 pages; maps and plates.* 68*s*

This book results from eight years' study of the descriptive literature of African ethnography. Because of the vast scope of his subject, Professor Murdock has restricted himself to describing the major movements of peoples and the development of culture in Africa from around 5000 B.C. up to the beginning of the twentieth century, and deals only with food-producing activities, the division of labour by sex, housing and settlement patterns, kinship and marriage, and the forms of social and political organization. There are general chapters on geography, race, language, economy, society, government and history; and regional chapters dealing with various tribal groupings. The seventeen maps include a large, folded, tribal map of Africa. It is important to remember that this book, a notable addition to the generalized literature on Africa, makes no attempt to describe present-day African societies, and the use of the present tense can be unfortunate, as in the statement "In many Negro states the funeral of a king is accompanied by human sacrifices, sometimes on an extravagant scale." Students of particular tribes or areas will welcome the bibliographies appended to each chapter.

J. M. ROBIN

THE ETHIOPIANS: an introduction to country and people. By EDWARD ULLENDORFF. *London: Oxford University Press*, 1960. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches; 232 pages; plates and map.* 30*s*

A book such as this has long been needed, and no one is more fitted to write it than Professor Ullendorff. Hitherto, in spite of a very extensive bibliography, the only general account of Ethiopia which covers all aspects has been Ludolf's 'Historia Aethiopica,' published in Latin in 1681, but still useful. The present book deals with the history of Ethiopian study and scholarship, geography, ethnic groups, history, religion and the Church, languages and literature, art and music, daily life and customs, and Ethiopia today. It ends with a selected bibliography. We are much indebted to the author for a book which is useful to the student and should be of interest to the general reader.

G. W. B. HUNTINGFORD

NORTH AND SOUTH AMERICA

MÉLANGES GÉOGRAPHIQUES CANADIENS OFFERTS À RAOUL BLANCHARD. Cahiers de Géographie de Québec: Numéro spécial: Numéro 6, avril-septembre, 1959. *Québec: Les Presses Universitaires Laval sous les auspices de l'Institut de Géographie*, 1959. 10×6¾ *inches;* 494 *pages; maps and plates*

This volume of essays presented to Professor Blanchard is the product of his long and fruitful association with Canada. The contributors are Canadians, both French and English speaking, and others who have taught in the universities of Quebec. Not unexpectedly a large majority of the contributions concern eastern Canada, though there are two or three of a general character. The volume, consequently, is a mine of information about eastern Canada, particularly its economic life, and will be a welcome addition to the relatively meagre geographical literature on this subject. Among the more widely interesting chapters of this kind are those by P. Dagenais, exploding the myth that Quebec is an essentially "peasant" province, and by L. Beauregard on the manufactures of Montreal. Among the non-Canadian chapters one should mention Professor Hare's account of the circumpolar atmospheric circulation, Professor J. Ross Mackay's account of the use of statistical methods in regional geography, and particularly Professor Baulig's thoughtful 'Géographie générale et géographie régionale.'

A. F. MARTIN

ALASKA IN TRANSITION—THE SOUTH-EAST REGION. By GEORGE W. ROGERS. *London: Oxford University Press (for Johns Hopkins Press)*, 1960. 9×6 *inches;* 384 *pages; maps and plates.* 56*s*

This is more than just another book on Alaska, full of "fabulous" photographs and cliché-ridden tourist propaganda; it is an analytical examination of the resources and economic future of the south-east region of the State. The preface describes this comprehensive, thorough book as a "pilot study to a broader study of Alaska in transition, now being prepared by the author, under the auspices of the Arctic Institute of North America and Resources for the Future." The author, by training an economist and public administrator, lives in Alaska and has feelings deeply rooted in the countryside.

The bulk of the book is a detailed review of the natural and human resources of the region, with special attention to resource development, and any generalizations that the author permits himself are made through examination of particular questions. There is an important chapter in which the region is put into geographical, social and economic perspective within its setting. Of particular interest too is the chapter "Federal bureaucracy and the Indian," a lucid and dispassionate statement of the issues arising in this time of transition. The author has no predictions to make about the economic future of Alaska: "the prospects of economic stability and growth hinge on a variety of local situations, in which natural resources have a large place . . . but nearly always adaptation to viable social patterns is a necessary ingredient."

JULIA ALLEN

NORTHWEST CONQUEST: the story of relentless struggle for the great Northwest Territory. By LAURAN PAINE. *London: Foulsham, for The Fireside Press*, 1959. 8½×5½ *inches;* 195 *pages.* 15*s*

This is a savage story. Oregon Territory, on the lower Columbia River, was settled at the cost of what must surely have been one of the most bitter and brutal struggles "to subjugate the hostile neolithics." White trappers, miners, cattlemen, lumbermen and farmers, intent on winning wealth and establishing new homes in the north-western wilderness, inevitably came into desperate conflict with the roaming bands of Indians, whose traditional lands were at stake. Few of the white men made any attempt to understand the Indians; the Indians found the white men completely baffling. Each group thought the other treacherous.

The struggle is recorded in this book, ambush by ambush, outrage by outrage,

revenge by revenge. Tantalizing glimpses of remarkable characters, hints at the social and geographical context, at important historical significances are overwhelmed by details of attack and counter-attack. No doubt it is well that we should be reminded how brutal clashes between white "civilization" and primitive savages could be a scant 100 years ago, but the reader cannot but wish that the narrative of grisly episodes had been welded into a more coherent whole. Part of the difficulty is the lack of a map of the region to clarify the intricacies of successive skirmishes and assassinations. A somewhat sensational style, featuring "seas of blood, tiers of corpses" and volunteers who "skunked the Cayuses, whipped and scattered all hostiles who wanted to fight," tends to obscure the meaning and importance of this tragic passage of historical geography.

IRENE M. SPRY

SONS OF THE SHAKING EARTH. By ERIC R. WOLF. *University of Chicago Press; Cambridge University Press*, 1960. 8×5¾ *inches;* 185 *pages; illustrations.* 40s

Subtitled 'The people of Mexico and Guatemala, their land, history and culture' this book has several clear merits; it is thoughtful, well constructed and generally authoritative. Diversity—physical, racial and linguistic—forms the theme of the opening chapters. In "Rise of the seed planters" the "beginning" of domestication is put at *c.* 6000 B.C. (This is none too early; and that *Zea mays* originated in Middle America (p. 63) is at least doubtful.) Pre-Columbian farming is examined in relation to the increasingly complex social structure and particularly the rise (and fall) of urban communities. How old is "the two-field system" in the New World? Just how important were more intensive methods involving terracing, irrigation, "use of humid bottom lands," and "floating" gardens (*chinampas*)? The decline of the Theocratic order (A.D. *c.* 750–900) is seen as reflecting both "an increasingly unfavourable ecological balance" and "a shift in the internal structure of society." Less than half the book is devoted to the Conquest and its aftermath. For Spain in particular, 1492 marked the closing of one (internal) frontier and the opening of another with far greater opportunities. Professor Wolf shows how these were grasped and how the results found—and still find—expression in the landscape and people of Middle America.

R. A. DONKIN

WANDLUNGEN IM ANTLITZ DER LANDSCHAFT UM SÃO PAULO (BRASILIEN): Ein Beispiel aus den feuchten Subtropen für den Anteil der Pflanzenwelt an den Problemen von Urlandschaft und Kulturlandschaft. By KURT HUECK. *Hannover: Forschungs- und Sitzungsberichte der Akademie für Raumforschung und Landesplanung*, 5, 4 (1958), pp. 1–41

Professor Hueck's short monograph describes the transformation of the landscape of eastern São Paulo from one in which biotic forces were dominant to one in which man has actively intervened. His theme is that in occupying this part of the humid subtropics European settlers removed the original plant cover only to replace it by a cultivated plant cover which, in terms of broad regional grouping, follows the same lines. To illustrate this point the author has prepared two maps of the area at a scale of about 20 miles to 1 inch, one of the original vegetation (*ursprünglicher Zustand*) and the other of the "cultural" vegetation (*jetziger Zustand*). He amplifies these maps with a full commentary which describes, region by region, the plant types shown on the two maps. The commentary is aided by a series of excellent photographs by the author which are of real use in understanding points made in the text. Small-scale maps of the main cultivated crops, based on *municipio* divisions, are too generalized to provide convincing evidence in Professor Hueck's thesis.

This monograph is both scholarly and well produced, so that questions raised in the minds of reviewers are those of interpretation and emphasis rather than fact. Such a question is raised by Hueck's map of original vegetation cover. The nature and extent of this cover have apparently been reconstructed mainly from the evidence of residual forests in areas like the Serra da Bocaina, and around Campos de Jordão, where species previously covering a wider area can be studied in the field. Limits of former extent are based partly on place-name evidence, "pinhal" and "pinheiro" elements

suggesting the earlier existence of *Araucaria brasiliensis* in places beyond its present range, and partly on early maps, notably that by von Martius (1858). The difficulty is in deciding precisely what landscape it is that Professor Hueck is reconstructing. Is his vegetation "original" in the strict sense, or merely pre-European-settlement? If the latter, one is puzzled why so little use was made of historical sources describing the landscape at periods since the sixteenth century, and in particular the wealth of material available for the early ninteenth century. The value of such sources in other parts of Brazil, notably Paraná and Minas Gerais, has already been demonstrated by Romariz.

A second question is raised by the correlation of present cultivated crop zones with those of original vegetation zones. While it is true that such a relationship appears to hold, more or less, at a small scale it is difficult to sustain the view that the latter provides a useful guide to the planning or prediction of the former. As the great American botanist Shreve regretfully concluded a half-century ago: "The only sound conclusions that may be drawn from the natural plant life of an area as to its agricultural possibilities are very general ones. The more specific the inquirer attempts to be, the more he is apt to be led into error" ('Floristic plant geography of Maryland,' 1909). These questions apart, however, those who have enjoyed Professor Hueck's previous writings on eastern Brazil can only hope that he may find time to return to the Paulista scene to amplify and extend the work so well begun in this monograph.

PETER HAGGETT

DIE WESTKÜSTE SÜDAMERIKAS. By ERWIN SCHWEIGGER. *Heidelberg-München: Keysersche Verlagsbuchhandlung*, 1959. 9×6 *inches;* 513 *pages; maps and plates. DM* 39.80

Since the time of Humboldt the west coast of South America has never ceased to fascinate geographers and naturalists. It is a coast whose features are influenced both by the great mountains of the Andes to the east, and on the west by the cold up-welling waters of the Humboldt current. The author has had first-hand experience of this coast for many years and his account of it is obviously a labour of love. It is first-rate classical geography; full of information for the specialist, but also readable with pleasure and profit by the layman. The oceanographic and climatological sections of the book are clearly the best. The peculiarities of the Humboldt current are considered in detail, and both this account and that of the climate are supplemented by the author's own data. The biological sections, on the other hand, appear to contain little that is original, but they are useful compilations. They may even draw the attention of professional biologists to some of the extraordinarily interesting ecosystems occurring along the west coast, such as the loma-vegetation of Peru and elsewhere. This characteristic plant community, consisting largely of annuals and geophytes, is confined to the seaward side of the hills, but its distribution is sporadic and it appears to be determined by the pattern in which outliers of the winter cloud mass formed over the ocean encroach on the land. The Humboldt current, too, has a corresponding influence on the composition and distribution of the planktonic and benthonic communities of the shore line. Herr Schweigger's book could have been very much improved, especially in the biogeographical sections, by the inclusion of adequate maps. The photographs, gathered at the end of the book, add little to the information in the text, and some are technically poor. This is all the more regrettable because hardly any region of the world is more photogenic, and with a little effort attractive and really instructive photographs could have been included. Nevertheless, 'Die Westküste Südamerikas' will be a very useful addition to the geographical literature of this area.

PETER BELL

AUSTRALASIA

PLANNING SURVEY REPORT OF CANBERRA CITY DISTRICT. *Canberra A.C.T.: National Capital Development Commission*, 1959. $13\frac{1}{4}\times8\frac{1}{4}$ *inches;* 58 *pages;* 12 *appendices; maps*

The National Capital Development Commission was appointed in 1958. Its first

major task was to review, in the light of present needs, the adequacy of the Statutory Plan for Canberra which had remained virtually unchanged since 1923. A basic survey carried out in 1958 was followed by the presentation of planning proposals in 1959. The present volume presents, in highly condensed form, the survey material and maps. There is a useful introduction on the history of the Federal Capital project: thereafter the volume follows standard practice with chapters on the physical background, land use and agriculture, population, employment, social conditions, public utilities and transport. The distinctiveness of the social geography of Canberra is emphasized by comparison with other towns. The survey material is presented concisely. There are twenty excellent colour maps. The volume is a valuable record of the geography of Canberra at an important stage in the growth of the city. Now the largest and fastest growing city in south-east Australia, Canberra is shown to be emerging in importance in a relatively new role as a regional centre with a widening sphere of influence.

M. J. WISE

THE STORY OF HAWKE'S BAY. By A. H. REED. *Wellington: A. H. and A. W. Reed; London: Bailey Bros. and Swinfen*, 1958. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches; 312 pages; maps and plates.* 25*s*

The settlement of Hawke's Bay is described from the time of the visit of Captain Cook in 1769 until 1890, and includes a brief account of Maori activity in the area before the arrival of the Pakeha. The account is arranged chronologically and is divided into pre-Provincial, early and late Provincial and post-Provincial periods. Within each period a very detailed account of the development of the area, with particular emphasis on the growth of Napier, is given. The part played by individuals, including settlers, missionaries and Maori chiefs, is considered, and many interesting early photographs help to recall these people and the scene of their endeavours. Colenso, one of the first missionaries, has played a large part in the early development of the area and his contribution is fully considered. Early journals and reports in the *Hawke's Bay Herald*, which started publication in 1857, shortly before Hawke's Bay achieved provincial status in 1858, are extensively used to give interesting details concerning daily life in the region, in town and country. Chapters are included on topics such as religion, education and communications, at different stages in the growth of the area, which give a very clear picture of the problems and difficulties as well as the energy and public spirit shown by the settlers in overcoming these problems, such as water supply and the development of a harbour at Napier. The relations between the Maoris and the settlers in this area are discussed and are shown to have been better than in neighbouring provinces during the period of unrest. The book gives a clear and detailed account of the early stages in development of Hawke's Bay, mainly from the personal point of view, and provides a vivid background which enables the modern landscape to be appreciated much more fully.

C. A. M. KING

POLAR

SIBERIAN ARCTIC: the exploration and development of the Kara Sea route. By JONAS LIED. *London: Methuen*, 1960. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches; 217 pages; maps and plates.* 30*s*

There are those who will say, after reading this book, that Mr. Jonas Lied was born out of his century, and this opinion will certainly be echoed, no doubt with critical overtones, by many of his former business associates in the Siberian Company. For the author, a Norwegian, belongs to the élite of the true merchant-adventurers, whose daring persistence so greatly extended the horizons of human knowledge in the fifteenth and sixteenth centuries.

'Siberian Arctic' was intended to be the story of a company, but the personality of the author dominates the whole, and it must be confessed that interest flags in those somewhat superficial chapters where the combative imagination of Mr. Lied is not engaged in its continual struggle with the forces of nature, with the Russian character

or with the bourgeois conservatism of his co-directors. It is nevertheless a wonderful story, of the dream of a Norwegian and an Englishman to establish a practicable sea route between the markets of the western world and the inexhaustible natural wealth of Siberia. It is a story which underlines the remarkable passivity of the Russians, both Tsarist and Soviet, when faced with the problems of estuary navigation under Arctic conditions, despite the immense possibilities offered by the Kara Sea route in opening up the hinterland of Siberia via the rivers Ób and Yenisei. It also justifies, without a shadow of doubt, the economic forecast of the Siberian Company, as is shown by the results of the expeditions of 1915 and 1916. But the Revolution of 1917 dashed the hopes of the promoters, and the story of the Siberian Company tails away through the final chapters in an atmosphere of discordant personalities and mutual recrimination.

Mr. Lied has some shrewd comments, however, on the Soviet attitude to the Kara Sea project and, despite some inaccuracies and the absence of an index, his book will appeal to all who have the future of Anglo-Russian relations at heart. For one day a new generation of Englishmen will build on the foundations laid by Captain Wiggins and Mr. Alfred Derry. We must hope that Norwegians of the calibre of Mr. Lied will be there to venture with them.

ANTHONY COURTNEY

CARTOGRAPHICAL AND MATHEMATICAL GEOGRAPHY

THE USE OF STEREOGRAPHIC PROJECTION IN STRUCTURAL GEOLOGY. By F. C. PHILLIPS. *London: Edward Arnold*, 1960. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* 86 *pages; text-figures.* 16*s*

By using a language, we are able to tell neighbours of our life and work, but strangers may not know our language nor we theirs. To attain comprehension under such circumstances another tongue has to be learnt. It is almost so in structural geology. People use different means for describing the same things. None is simple, because structures develop in three dimensions but attempts have to be made to describe them in two. Many geologists find this exercise difficult whatever method they employ. In the past, views were usually illustrated more or less pictorially by using vertical sections or profiles suitably juxtaposed to simulate a glimpse as if through a transparent solid. Dr. Phillips by using another language achieves satisfactory results and more and more geologists are following him. He prefers "stereographic projection as affording the neatest representation of three-dimensional geometry and combining ease of solution with extreme speed." Nowadays few writers discussing structure feel complacent unless their script is embellished by figures of which the one on page 60 is an example. To one who should or must learn the language of stereographical projection Dr. Phillip's book is as lucid an account as can be imagined. The appearance of this second edition six years after the first is evidence that no one in the meantime has devised a better book on the subject.

J. V. HARRISON

PHYSICAL AND BIOLOGICAL GEOGRAPHY

PRÉCIS DE GÉOGRAPHIE PHYSIQUE GÉNÉRALE. By PIERRE BIROT. *Paris: Armand Colin*, 1959. $9\frac{1}{4} \times 7\frac{1}{4}$ *inches;* 403 *pages; maps, plates and diagrams*

This book is a general text on physical geography, and in a condensed manner contains a great deal of the kind of material that is to be found in the much longer, and older, treatise of de Martonne. The make-up of Birot's volume is interesting. The first book, following an introductory chapter, is devoted to climate. The treatment is conventional and the usual topics are all discussed. The final chapter of this section applies the general discussion of temperature, pressure systems and precipitation to the land masses.

The second book is by far the longest, and is subdivided into three parts—the whole is called 'Les paysages des continents.' The first section is perhaps the most interesting and original of the whole volume. It deals with soils in relation to climate; the plant cover; the relation of soils to slopes and the evolution of slopes; the general principles

of river erosion; peneplanation, and closed depressions of all types. The next part is concerned mainly with the nature of erosion in relation to soils, rocks and vegetation in the main climatic zones of the world; and the final section deals with the influence of structure on relief. There might seem from this brief summary to be a good deal of overlap between the chapters, but this has been avoided. The author has succeeded in uniting the ecological and physical facets very well. It is the interlinking of the biogeographical factors with those concerned mainly with erosion and deposition that makes this section of the book one of considerable value to the student. The final part is devoted to an account of the oceans and coasts. This is the least satisfactory; the descriptions and discussions are too short and the account of beach processes is inadequate.

Although overlap between major topics has been avoided, the arrangement of the book does mean that certain subjects—*e.g.* soils and the continental platform—have to be discussed in different parts of the book. There may be good reasons for this, but nevertheless it makes somewhat awkward reading. The diagrams are clear, and the plates usually good. The use of colour for some of them is to be welcomed in principle, although a few of the diagrams are somewhat crude. The volume is a useful and welcome addition. An index and a somewhat fuller bibliography would be assets. It is not usually difficult to read, but occasionally the wording is involved,—*e.g.* (p. 193) "Cependant, il ne saurait être question de généraliser l'explication, la régularité géométrique des dunes longitudinales étant plus grande que celle de n'importe quel relief normal et leur conformité avec le vent dominant n'étant pas niable." J. A. STEERS

THE EARTH BENEATH THE SEA. By F. P. SHEPARD. *Baltimore: Johns Hopkins University Press (London: Oxford University Press)*, 1959. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches; 276 pages; maps, illustrations and diagrams.* 30*s*

This excellent little book brings up to date the author's 'Sub-marine geology,' published ten years ago. Although it is non-technical it loses little in content and gains much in presentation and interest. The science of oceanography is advancing rapidly in these days of the aqualung, the bathysphere and sea-bed cameras; the debt owed to the Scripps Institute of Oceanography is also very justifiably evident. Professor Shepard rightly doubts the existence of ocean bottom currents with velocities exceeding sixty miles an hour; Terzaghi's alternative theory of the liquefaction of sediments by earthquakes to account for sub-marine canyons is given. However, his enthusiasm leads to slight repetition in the book. The fascination of the first-hand account of a Hawaiian *tsunami* is equalled by the masterly summary of the more difficult problems of beach gradients, of hard and soft sand surfaces, and of beach cusps. Professor Shepard's plea for superseding soundings on charts by contours is more justified now that the cartographer can be provided with photographs of the sea floor, than when Veatch and Smith over-confidently contoured the continental slopes off the mouth of the River Hudson.

Brevity occasionally conceals the real argument, as in the reference to the occurrence of glacial striae satisfying Professor Shepard that the Cabot trough is glacial, and to mud being winnowed out of the till by bottom currents. The cohesion of clays, which makes them harder to erode than banks of quite large shingle, seems to have been partly overlooked. Also the eroding effects of the Gulf Stream could better be judged if the bottom velocity and not the surface velocity was given. However, these are most minor criticisms of a book packed full of valuable and new information, presented in a most attractive form with the help of admirably conceived and vivid diagrams.

W. V. LEWIS

HUMAN AND HISTORICAL GEOGRAPHY

THE DEFEAT OF THE SPANISH ARMADA. By GARRETT MATTINGLY. *London: Jonathan Cape*, 1959. 9×6 *inches*; 382 *pages; plates.* 25*s*

THE ELIZABETHANS AND AMERICA. By A. L. ROWSE. *London: Macmillan*, 1959. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches; 222 pages; map, plates.* 25*s*

These two books by eminent historians cover two of the most important themes in

the maritime history of Elizabethan England, namely the defence of the realm and the events leading to the exploration and colonization of North America. It might appear at first sight that yet another account of the Armada would have little new to offer. The first few chapters of Professor Mattingly's book, however, provide ample evidence to the contrary. His narrative begins, not on the Channel shore nor even in London, but at Fotheringay Castle at the trial of Mary in 1587. From there we are taken to Greenwich, Paris, Brussels, Rome and, finally, to the Palace of the Escurial near Madrid to assess the effect which Mary's execution had in the leading countries of Catholic Europe. It is this event, rather than the sailing of the Armada fleet, which is the true starting point of what was to be the first major battle at sea. Only against this contemporary European background is it possible to appreciate the reasons which caused Philip II to assemble and sail his great fleet against England. This European approach adopted by Professor Mattingly has meant that he has succeeded in writing a better balanced and unbiased account compared with the earlier texts. To the well known factors, such as the manoeuvrability of the English ships and the greater effectiveness of their armament, he has added others which he suggests contributed to the Spanish defeat. The small incident of Drake burning the barrel staves at Sagres meant that the Armada sailed with water butts made of unseasoned wood, with the result that they quickly leaked. It is true that during the later stages of the campaign the Spanish commander, Medina Sidonia, was just as concerned with lack of provisions and consequent deterioration of the health of his crews as with the ever attendant English fleet. Earlier accounts have been very critical of the way in which Medina Sidonia handled his ships and have tended to attribute the Spanish defeat to his relative inexperience. As Professor Mattingly points out, however, he did succeed in bringing two thirds of his original fleet back to port, and that in spite of the long and hazardous voyage around Scotland and Ireland. The book is undoubtedly one of considerable scholarship and is written with such clarity and skill that it can be profitably read by scholar and layman alike.

In a book based on an expanded version of the first series of Trevelyan lectures which he gave at Cambridge, Mr. Rowse paints a picture on a broader canvas, the struggle with Spain being seen in the context of rivalry in American colonization. Spain had been in the field for almost a century before English endeavours were made in this direction and it is therefore not surprising that the early English attempts were little more than piratical attacks on Spanish bases and trading ships. The book, however, is not only a chronicle of events, for it contains extensive biographies of the main personalities who occupied the North American stage during the latter half of Elizabeth's reign. Mr. Rowse is at his best when writing about people and it is fortunate that many were from his own West Country. As in the events of the Armada, the author makes it clear that Elizabeth's role was a major one for, although she was surrounded by her political and geographical advisers, she was no mere figurehead. In North American affairs, as well as in matters nearer home, she showed that she was often a more able strategist than her more impetuous sea commanders. Through his earlier writings on related themes Mr. Rowse has already established himself as an authority on Elizabethan England, and in this latest book he displays the great breadth of his interest by adding yet another chapter to our knowledge of Elizabethan enterprise and endeavour.

A. H. W. ROBINSON

THE TRAGIC HISTORY OF THE SEA 1589–1622. Narratives of the shipwrecks of the Portuguese East Indiamen *São Thomé* (1589), *Santo Alberto* (1593), *São João Baptista* (1622) and the journeys of the survivors in South-east Africa. Edited from the original Portuguese by C. R. BOXER. Works issued by the Hakluyt Society, 2nd ser. No. CXII. *Cambridge: Published for the Hakluyt Society at the University Press*, 1959. 9×6 *inches;* xiv+297 *pages; illustrations and maps.* 40*s*

Professor Boxer, well known as a scholar with an unusual command of foreign languages, presents complicated Portuguese narratives of sea voyages and disasters translated into good English and elucidated in an excellent introduction. The round

voyages made at the end of the sixteenth century by Portuguese Indiamen between Lisbon and Goa were considered by contemporaries "without any doubt the greatest and most arduous of any that are known in the world." Judging from the narratives chosen by Professor Boxer, the words are not too strong. And as the great carracks get close to the shore and begin to break up under the stress of the heavy seas it is necessary to recall that we are here dealing with disastrous voyages. No doubt the good pilots were employed navigating the better ships.

The nature of these arduous voyages is described in fascinating detail, the introduction illuminating the narratives. What is surprising is the casual reliance on good luck, justified perhaps by the very many successful voyages. The carracks were large and crowded; provisions were poor; the seamen despised and lubberly. The navigational aids were at that date few and the seas to be crossed wide and storm ridden. Yet the carracks were noted for the regularity with which they made the outward passage, perhaps 10,000 miles in about 200 days. Passengers crowded on board at Lisbon without due regard for their lives and diseases swept them off during the voyage. It is a sad story, even without the shipwrecks which usually occurred on the homeward voyage. Wilful overloading at Goa coupled with an inadequate refit contributed to the many disasters off the coast of Natal. Yet this is a record of determination and heroism and the narratives made popular reading in Portugal at the time and afterwards.

GEORGE NAISH

GENERAL

THE CAXTON WORLD ATLAS. Edited by W. GORDON EAST. *London: The Caxton Publishing Company*, 1960. 16×11 *inches; 500 pages; maps and plates.* £31 10*s*

This atlas is, in fact, a work of geographical reference. Over 500 pages of text, written largely by past and present members of the geography department of Birkbeck College, and accompanied by a separate index of some 4500 entries, is divided into ten parts to cover the major regions of the world. Concise descriptions of each country include sections on surface features, climate, vegetation, settlements, government and economy, together with much useful information on the position, importance and trade of principal cities. There are many well chosen illustrations, tables of trade statistics, which could have been extended with advantage, and specially drawn inset sketch-maps, some of which are too small and generalized for serious use by students.

The atlas, by George Philip and Son, has 104 plates and an index of over 60,000 names. It resembles the 'Standard Reference Atlas' but contains extra plates. Many others have been re-drawn. In particular, attention has been given to the better use of colour in depicting relief, and to the clarity of names. The countries of each continent are well represented; North Africa receives better treatment, but only three plates are devoted to Australasia, and Israel is only an inset. It is unfortunate that Italy should be given "autobahn" instead of "autostrada," and the text and atlas cannot agree on the spelling of Brasilia, the new capital of Brazil. In general, the work could be well recommended if the price were reduced substantially by the possible omission of the sixteen decorative colour plates at the beginning of the volume.

E. E. T. DAY

ESSENTIALS OF GEOGRAPHY. 2nd edition. By OTIS W. FREEMAN and H. F. RAUP. *London: McGraw-Hill*, 1959. $9\frac{1}{2}\times7\frac{1}{4}$ *inches; 511 pages; maps, plates, text-figures.* 60*s*.

This is the second edition of a textbook first published in 1949 and reviewed in this *Journal* (*Geogr. J.* **115** (1950) pp. 247–8). 'Essentials of geography' "first surveys earth relations, the atmosphere and the tools of geography," and this section is followed by six chapters on the climates of the earth and their relation to man and other organic life. But the greater part of the book is a survey of the economic geography of the world, arranged in chapters on agriculture, minerals, water resources and so forth. This new edition has been thoroughly revised and brought up to date; there are 300

illustrations and most of the photographs did not appear in the old edition. Considerable space is given to the economies of primitive peoples, and there are useful chapters on rural and urban life and on "geography and nations." This book is designed as a textbook for university students, with summaries, questions and selected references at the end of each chapter. E. W. GILBERT

APPLIED GEOGRAPHY. By L. DUDLEY STAMP. *Harmondsworth: Penguin Books*, 1960. 7 × 4½ *inches; 207 pages; maps.* 3*s* 6*d*

Here is a welcome addition to the Penguin-Pelican series of serious books designed and written for large audiences. It will certainly be widely read by the interested layman, despite the slightly off-putting title, because of Professor Stamp's well-known style of writing—his choice as examples of well-known topics of the day, the width and common sense of his comments on involved situations, the judicious sprinkling of nuggets of interesting fact or opinion all through the text.

Some of us could say, on looking through it, that we have heard much of this before—Professor Stamp's views on many of the topics discussed in the book, especially on land use and land planning matters, being very well known. But this is not the point. The book is not really written for people like us. It seeks to interest and encourage those who have had an orthodox introduction to geography at school and/or at university. From this book they will catch vivid glimpses of some of the interesting possibilities in the application of geographical knowledge.

One could query the layout of the book, feeling that some chapters are lightweight in comparison with others (such as chapters twelve to fifteen). Perhaps economic geography should have been given more pride of place as a major aspect of applied geography? It might also be agreed (though this is controversial) that the book describes subjects other than geography. For example, a large part deals with the history, principles and practice of physical land use planning. Lastly, this reader for one would have liked some selected references and a bibliography.

But criticisms of this order fall into insignificance against the over-all fascination of the book and the way in which it has been constructed and worded. The author makes his basic approach clear in his last sentence "I am conscious of the many omissions, the many cases of quite inadequate treatment, perhaps the many half truths; but if I have done something to stimulate interest I shall have achieved my object."

G. P. WIBBERLEY

PROCEEDINGS OF THE INTERNATIONAL GEOGRAPHICAL UNION REGIONAL CONFERENCE IN JAPAN, 1957. *Tokyo: published by the Organizing Committee*, 1959. 10 × 7 *inches; 600 pages; maps and plates*

The very successful regional conference of August–September 1957 in Japan, organized by the Japanese National Committee under the auspices of the International Geographical Union, has already been recorded in the *Geographical Journal* (**124**, 1 (1958) pp. 130–1) and a note published of some of the maps shown in two special exhibitions (*Geogr. J.* **124**, 2 (1958) pp. 279–80). The 'Proceedings' of the Conference have now been published in a single well-produced volume of 600 pages, which may well serve as a model of its kind. The factual record of participants and a diary are followed by an annotated list of maps shown in the exhibitions—an invaluable guide to both the modern maps of Japan and the wealth of historical material, especially in the Tenri Central Library, much of it recorded for western readers for the first time. There is also an introduction to the ancient cartography of Japan. Five long excursions were arranged for overseas participants, and are succinctly reported. Some excellent photographs, three in colour, serve to recall highlights of meetings and excursions. The bulk of the volume is then devoted to the 120 papers delivered at the Conference, mostly published in the form of extended abstracts. In the report of the Symposium on South-east Asia the discussion is also briefly recorded. To attempt to select papers for special mention would be an invidious task, but undoubtedly the value of the volume lies especially in those papers—about half the total number—in which

Japanese geographers summarized their work in English (apart from a few papers in French). Factors of physical geography play a large part in the life of the Japanese people—the existence of volcanic and seismic activity, the shortage of cultivable land, the dependence on food from the rivers and the sea—and this is reflected in the subjects of research papers presented. There is a strong element of applied geography. Volcanic and seismic phenomena, micro-relief, the character of river water, the incidence of ocean currents and typhoons, landslides and micro-climate—to choose a few examples—are studied both *per se* and in their influence on human occupance. Naturally, various aspects of land use figure largely and the Japanese emphasis on detailed investigation of land forms rather than conventional soil studies is brought out. The urbanization of Japan is also marked by a number of papers. It would be wrong to suggest, however, that the Conference was devoted exclusively to Japan or even to Monsoon Asia. There are many contributions of world-wide significance.

In an appendix is a full list of publications issued or distributed in connection with the Conference—in itself a guide to recent literature on Japan in English.

'L. DUDLEY STAMP

READINGS IN URBAN GEOGRAPHY. Edited by HAROLD M. MAYER and CLYDE F. KOHN. *University of Chicago Press; London: Cambridge University Press*, 1959. $9\frac{1}{2} \times 5\frac{1}{2}$ *inches;* 626 *pages; maps and diagrs.* 60*s*

Within the covers of this large single volume are collected more than fifty papers on a wide range of aspects of urban study. The relative importance of such a diversity of economic, sociological, geographical, and planning studies must of course depend upon the standpoint of the reader, but a geographer is inclined to draw special attention to the important section on the general nature of city structure, and to the inclusion of the work of Harris and Nelson on functional classification of American cities, of that of Murphy and Vance on delimiting their Central Business Districts, and of that of Alexander and Alexandersson on the economic base of towns. Apart from very brief introductions to the 18 sections under which the papers are grouped, all the material contained in the book has already been published, with few exceptions in American journals and books. It deals almost exclusively with the American urban scene, and this at once suggests the limitations of the collection as representative of the corpus of urban geography. However important it may seem to students of urban geography and town planning in America to concentrate their studies upon their own cities, it must be realized that the urban scenes in Europe and other long-settled parts of the world are very different. Urban geography there requires quite a different balance in approach.

British geographers who are not specialists in the urban geography of the U.S.A. will therefore find the book of only limited appeal, more especially as no fewer than nineteen of the papers included are reprinted from the journals *Economic Geography* and the *Geographical Review*. For British town-planners, too, the techniques and even tools of analysis that are used, appropriate as they are to American towns, have very limited application to their own different problems.

A. E. SMAILES

MOUNTAINS AND MOUNTAINEERS

RAKAPOSHI is the account by Captain Banks of his two expeditions to that great mountain, the first of which failed and the second, a "combined operation" with the Pakistan forces, succeeded in conquering it (*Secker and Warburg*, 1959, 25*s*). The chief interest of the narrative, which is detailed but clear and straightforward and often enlivened with humour, is that it brings out the peculiar hazards and unpredictabilities of Himalayan mountaineering; both the failure and the success were by the narrowest of margins and the latter, involving a final climb to the summit in a blizzard, was clearly, as the Duke of Wellington said of the battle of Waterloo, "a damned close-run thing." Captain Banks is evidently a first-class staff officer, competent in both strategy and logistics; but all his planning and preparation were

nearly brought to nought by the weather. As is usual in recent Himalayan literature, there are excellent photographs and a meagre sketch-map.

The theme of THE LAST BLUE MOUNTAIN (*Chatto and Windus*, 1959, 21*s*), the story of the expedition to Haramosh, not far from Rakaposhi and almost as high, is essentially the same; for, though the attempt on Haramosh ended in disaster, while that on Rakaposhi eventually succeeded, the results might easily have been reversed. The survivors of the Haramosh expedition, however, have had too much literary modesty to write about it themselves and have let Mr. Ralph Barker work up their diaries and other material in the style of those "fictionalized" biographies now so popular, with invented dialogue and accounts of their thoughts and emotions. This sort of writing can seldom escape a taint of *pastiche*, and there are passages here, particularly in the earlier chapters, which read like extracts from a not very high-brow novel. The story of the actual catastrophe is so dramatic that it practically tells itself, and the book works up well to this climax. Nevertheless, one feels that an account, however artless, by an actual member of the expedition—preferably Captain Streather, its most experienced climber—would have been better than this reconstruction at second hand. As in 'Rakaposhi,' the photographs are good but the sketch-map is inadequate.

The third book on this list AN ECCENTRIC IN THE ALPS, by Ronald W. Clark (*Museum Press*, 1959, 35*s*), is of more general interest, dealing as it does not merely with mountaineering but, still more, with psychology; for its subject, the Reverend W. A. B. Coolidge, was a remarkable man with a peculiar mental make-up. An expatriate American of the Victorian Age, he climbed mountains all over the Alps with his aunt and his dog, became a Fellow of an Oxford College, took Anglican Orders, though his temperament was most unclerical and his religion has been described as "High Church in theory and no church at all in practice," made himself the leading authority in English on the history of Alpinism and of the Alps in general, quarrelled, for the most part unreasonably, with almost every other Alpinist of distinction, resigned from the Alpine Club in a fit of temper and finally retired to Grindelwald, where he passed all his later years in cantankerous isolation. His life makes an entertaining story. In another sense, however, his story is a tragedy: the most active and diligent of mountaineers and the most learned and accurate of Alpine historians, he yet, through lack of a sense of proportion, let his scholarship degenerate into pedantry, his honesty into rudeness and his pride into arrogance. Mr. Clark denies that he was ever mentally unbalanced; but it seems clear that what had begun in youth as a mild inferiority complex had developed in old age into something not far from persecution mania—and all because of the Alps!

ACROSS THE ALPS (*Berne; Kümmerley and Frey*, 1959, 65*s*) is a series of views (some in colour) taken from "Swissair" planes and covering the whole Alpine region from the Riviera to the Wienerwald, with explanatory notes and introductory essays from several hands, including that of Sir Arnold Lunn. Some of the photographs are strikingly beautiful; but, as the captions show, they have been chosen, not for beauty but as illustrations of the physical features and geology of the various Alpine and sub-Alpine regions. As a rule, indeed, aerial photographs, for obvious reasons, fail to bring out the beauties of a mountain region as effectively as those taken from the ground. From this point of view the choice of subjects has mostly been judicious, though there has been a natural concentration on Switzerland compared, for instance, with only two views of the Dolomites and none of the Julian Alps, while the harbour at Cannes has not much Alpine relevance and the Esterel coast is not really Alpine at all. Some of the letterpress, doubtless originally in German, reads a little oddly in translation and there are one or two errors, such as wrong heights (in feet) given for the Gran Paradiso and the Dent du Midi; but as a whole this is a fine production.

L. COLLIER

MOUNT EVEREST (*Zürich: Orell Füssli Verlag*, 1959, *Sw. Frs.* 24) is an ambitious book, encompassing in one volume (in German) the geology, anthropology, history and geography of the Everest region. Dr. Toni Hagen's section is most scholarly, of

great interest to geologists, but written with sympathy for the uninitiated too. Dr. C. von Fürer-Haimendorf's anthropological section is masterly, quite fascinating and deserves a book of its own. I know of no other full-scale work on the Sherpas, who both deserve and are lucky to have so brilliant an investigator. At the end of the book is an authoritative map and a meticulous explanatory note by Erwin Schneider. These three write as scientists. Dr. G.-O. Dyrenfurth, a scientist too, writes as a historian of expeditions. This section appears for completeness' sake, but seems the least in place. The story is presented with great care but contains, perhaps inevitably, the odd inaccuracy. It must, also inevitably, date very quickly as the other sections will not. 'Mount Everest' is impressively illustrated and most lavishly produced.

The answer to my prayer that mountaineering be kept separate from science seems to come in the massive CHRONIQUE HIMALAYENNE of Marcel Kurz (*Zürich: Swiss Foundation for Alpine Research*, 1959). This is an account of Himalayan climbing, extracted chiefly from the yearly volumes of 'The mountain world,' during the 'Golden Age' between 1940 and 1955. Not an expedition seems to have escaped the author; the accounts are as readable as they are impressive in their detail. The giants are here: Everest, K.2, Kangchenjunga, Makalu, Nanga Parbat; but the small ventures, undertaken for instance during the war by service men out East, also find their place. Indeed, the author shows that he knows more about the peaks than most of us did ourselves. The accompanying photographs are superlative. If a line must be drawn, and it certainly must if the book is not to date, 1955 is perhaps as good a line as any. But we must hope for a second instalment, in which will be found Lhotse, Manaslu, Broad and Hidden Peaks, the Mustagh Tower—who knows how many more?

Indefatigable in his exertions for the Swiss Foundation, Marcel Kurz is also joint editor with H. R. Müller of its *Journal*, a yearly account of happenings in the Alps and elsewhere which contains articles in French, German, English and Italian. Before going on to give a great deal of information, the current issue, Vol. II, nr. 8, 1959, starts with a most interesting correspondence on Othmar Gurtner's controversial Eigerwand article in 'The mountain world,' a battle of the Classics and the Romantics all over again. Any journal embracing expeditions all over the world must give an impression of "bits and pieces." The Himalaya appear briefly, the Andes more fully. There are accounts of two seasons at the major Alpine centres, of climbing in Greece, New Zealand and Central Africa—but not in the Caucasus. Some entertaining notes by Sir Arnold Lunn close the number.

The Journal of the Austrian Alpine Club (JAHRBUCH DES ÖSTERREICHISCHEN ALPENVEREINS, Innsbruck, 1959) is a characteristic mingling of the scientific and the historical, the reminiscent and the tigerish, which I find very attractive. The Austrians seem not to lose their sense of eternal values in the welter of *Erstbesteigungen* for which the mountaineers of Innsbruck are famous. It is therefore refreshing to find the struggle for the direct route on the Cima Grande (I cannot accustom myself to the Grosse Zinne) alongside an account of Archduke John as a mountaineer, or an article of the older tradition, "In meinen Bergen," to set off the magnificent Alpamayo, here beautifully photographed. To give good measure the Journal closes with a useful detachable map of the Langkofel and Sella groups. WILFRID NOYCE

SHORTER NOTICES

C. R. G. Worcester's THE JUNK MAN SMILES (*Chatto and Windus*, 1959, 21*s*) is a most enjoyable book. Its author was for many years in the River Inspectorate of the Chinese Maritime Customs. He became an authority on the myriad varieties of junk on the rivers of China and wrote a 'History of the boats of China.' He has now most successfully drawn on his experience to produce a lighter and non-technical book and has illustrated it with delightful sketches throughout. Through all his descriptions of his travels and experiences there shine his affection for the Chinese people and his absorbing interest in boats and boatmanship. The China that he describes has presumably passed away to a very large extent, but the value of his book remains.
B. H. F.

Antonia Deacock's NO PURDAH IN PADAM (*Harrap*, 1960, 16*s*) is the story of the Women's Overland Himalayan Expedition of 1958. Three women—Anne Davies, Eve Sims and Antonia Deacock (the leader of the expedition)—drove 16,000 miles to India and back, unescorted; trekked 300 miles on foot in the mountains; twice crossed the Greater Himalayan Range; traversed five high passes between 13,000 and 18,000 feet; climbed a virgin peak; explored in eastern Zaskar, where European women had never before been seen, and studied the lives of women just released from purdah. The day to day happenings of this journey are described in fascinating detail. Dame Isobel Cripps, the "fairy godmother" of the trio, who assisted in so many ways, has written an introduction; there are two maps and eleven half-tone plates. E. M.

* * *

So few books are published about Israel that Juliette de Bairacli Levy's SUMMER IN GALILEE is most welcome (*Faber*, 1959, 25*s*). Once the reader has accepted an awkward style and a certain clumsiness in narrative construction, there is much in this rather unusual book to hold the attention. The author is of Turkish-Jewish descent, apparently born and brought up in the north of England; she has travelled with gypsies in Europe, North Africa and the Middle East, and two visits on her own to Israel, seven years apart, are the subject of this book. A passionate animal lover, a knowledgeable herbalist, a keen student of folk-lore—all these facets of a complex personality emerge from an uneven but arresting book. D. M.

* * *

Fosco Maraini will be known to some as the leader of the Italian expedition which climbed Gasherbrum IV in the Himalaya in 1958. In his MEETING WITH JAPAN (trans. E. Mosbacher, *Hutchinson*, 1959, 50*s*) he is to be found in a different guise, that of a connoisseur of Japanese civilization. Maraini lived in Japan before the war, and was interned from 1943 until the Japanese surrender. This book is ostensibly an account of his journeys on his recent return to Japan, but in fact points on the journey are made into pegs on to which there is hung sometimes a piece of Japanese history, sometimes a penetrating account of some aspect of Japanese civilization, sometimes a portrait of a Japanese home. The author's deep culture and profound scholarship are very much in evidence, so that the book is strong meat if seen as a travel book, but a most attractive and piquant *hors d'œuvres* if seen as a serious introduction to Japanese history and life. It is, moreover, beautifully illustrated and well produced (but heavy to hold). B. H. F.

* * *

TURKEY, introduced by Lord Kinross; photographed by Yan; descriptive commentaries and notes by Robert Mantran (*Thames and Hudson*, 1959, 70*s*): this handsome collection of photogravures (printed in France) gives a lively impression of the best things to see in Turkey, including town and village scenes, architectural features and archaeological treasures. Unfortunately, the publishers follow their usual practice—a particularly irritating one—in not printing titles on or opposite the plates, but in numbering them and forcing the reader to refer to various indexes scattered throughout the volume. Another equally irritating blemish is the inconsistency in rendering Turkish words and place-names. The text having been originally written in French, the translator has in most cases given a French transliteration of Turkish names, though in a few cases (*e.g.* Cami) the modern Turkish orthography is attempted, but even here she sometimes lapses into Djami (French style). Similarly, Alaca is sometimes correctly spelt, but in other places as Aladja. J. H. M.-C.

CARTOGRAPHICAL PROGRESS

THE TIMES ATLAS OF THE WORLD. Mid-century edition. Volume II. South-west Asia and Russia. Edited by JOHN BARTHOLOMEW. *London: The Times Publishing Co.*, 1959. $19\frac{1}{2} \times 12\frac{1}{2}$ *inches. Plates* 25–48. *Index*, 51 *pages.* £6 6*s*

With this volume, the mid-century edition of '*The Times* Atlas of the World' is now complete. For remarks on the general style and compilation, reference may be made to the review in this *Journal*, June 1955, pp. 208–9. One of the chief features of this volume is a map of the Union of Soviet Socialist Republics in nine plates on the scale of 1:5M (approximately eighty miles to one inch), making it unique among modern, or indeed all, atlases except the Russian. This has been possible only through the existence of large-scale Russian atlases such as the 'Atlas Mira,' a debt which is acknowledged by the cartographers. A rapid comparison with the comparable sheets in the former edition of *The Times* Atlas makes very clear the advance which has been achieved. In accordance with general policy, all place-names have in the first instance been transliterated from the Russian, and the names of geographical features are also given as transliterated from the Russian terms. A short glossary of such geographical terms is given on the reverse of each sheet. To derive full benefit from these plates it is really necessary to memorize this list, otherwise the significance of *peski* (sands), *solonchak* (salt marsh) and *sor* (mud flat) will escape the map reader. What with the names of the Republics, autonomous republics, autonomous provinces, districts and territories, as well as regional geographical names, it is sometimes a little difficult to determine readily what the terms apply to. It is a little strange to find *Gorye* mountains, placed across a series of lowlying marshy river valleys. (Somewhat similarly the placing of the range names in the Himalaya requires some sorting out.) The occurrence, as a name of an inhabited place, of "Im. 26 Bakinskikh Komissarov" arouses curiosity, but it appears to stand for "named for the 26 Bakinski Kommissars." It is difficult to obtain rapidly a comprehensive view of the political structure of the Union from these sheets, which are principally topographical, layer coloured, maps, and for this purpose a politically coloured map, perhaps as an inset, would have been useful—similarly for the Provinces of India.

Another useful map is that of Israel and part of Jordan on the scale of 1:500,000 which shows, among other things, the armistice lines and demilitarized zones. Incidentally, on other sheets it might be preferable to show undemarcated rather than disputed boundaries.

However, most of these are more or less minor points. The maps are as usual well drawn and executed. Some of the plates are particularly expressive, as for example Plate 34, Iraq, Syria and Lebanon, with its representation of sand dune areas, lava fields, rock escarpments, etc. Plate 30 includes a large-scale map of the Mt. Everest region, but the representation of relief is not so successful since the use of white (elsewhere used for the highest areas) for the glaciers produces an effect of inversion. On the other hand, the general map of Eurasia shows what can be done with a well chosen ground tint and careful hill shading. The index, with over 40,000 entries, is particularly useful, since it makes generally available for the first time a comprehensive geographical index to the U.S.S.R. on a systematic basis of transliteration.

With the publication of this volume, the cartographers and publishers have provided, despite some shortcomings, an atlas unique in its coverage and scales employed, and one which should have an even longer life than the edition it supersedes. There is one fact which testifies to its scope: the five indexes together contain some 195,000 entries.

G. R. CRONE

TRIBAL MAPS OF EAST AFRICA AND ZANZIBAR. By J. E. GOLDTHORPE and F. B. WILSON. *Kampala: East African Institute of Social Research; London: Kegan Paul*, 1960. $8\frac{1}{4} \times 5\frac{3}{4}$ *inches;* 8 *maps;* 15 *pages text. East Africa*, 5*s; elsewhere*, 7*s* 6*d*

In this short monograph Dr. Goldthorpe and Mr. Wilson provide what has long been

needed, maps showing the distribution of the main tribes of East Africa and Zanzibar. There are eight maps in all. The first uses the dot method to show the distribution of African population in East Africa, based on the 1948 census. The second, on the same scale, shows the main tribal groups of the area. The next four maps give tribal distributions in Uganda and Kenya in greater detail, and the last two show the distribution of rural population in Zanzibar and Pemba respectively, based on data obtained in 1931. For various reasons Tanganyika has not been dealt with as fully as the other territories and only tribes making up one per cent. or more of the African population have been shown, except for a few smaller tribes of special interest. The monograph also includes notes on existing sources and a useful list of alternative names of certain tribes.

The maps, drawn in the Geography Department of Makerere College by Mr. A. Serubiri and Mr. J. K. Mbazira, are both clear and attractive, and the whole work should prove invaluable to all students of East Africa. J. M. ROBIN

A DESCRIPTIVE ATLAS OF NEW ZEALAND. Ed. by A. H. McLINTOCK. *Wellington, N.Z.: Govt. Printer*, 1959. 12×10 *inches;* xxi+110 *pages of text and index.* 48 *pages maps*

This is an excellent publication. It presents in handy format a wealth of information about New Zealand, and is far more comprehensive than its title suggests. It is, in a way, "an analysis and assessment" of the country's resources. It is an official publication. Plans for its publication were approved early in 1954, when the Government set up an advisory committee under the chairmanship of Mr. R. G. Dick, Surveyor-General. The main burden of production seems to have been shared by Mr. Dick, Mr. A. H. McLintock (editor and parliamentary historian) and Mr. R. E. Owen (the Government Printer), and they are to be congratulated on the high standard achieved. The Atlas will prove of value to statesmen and businessmen, as well as to students and teachers.

The atlas consists of text, photographs, full-colour maps and a gazetteer. The text is comprehensive. Written mainly by members of various government departments, it includes contributions on the history (Maori settlement, and European discovery and early colonization) and government of New Zealand as well as others on the physique, natural resources and present population. Interspersed in the text are a number of diagrams, graphs and line maps. Consisting in all of more than 100,000 words, this section of the atlas is virtually a textbook. Also interspersed in the text are twenty-five extremely good photographs (aerial obliques) which show admirably the patterns of the countryside, after less than 150 years of European occupance. Each is accompanied by a detailed description.

Finally there are the maps and gazetteer. The maps vary in scale. Of greatest value to geographers is the set of fourteen maps, on a scale of 1:3,200,000, showing geology, soils, pre-European vegetation, distribution of population at the 1956 Census, land classification, land utilization and manufacturing. These are in the tradition of the national atlases of other countries. It is to be regretted that the suite of climate maps is not on the same scale (the climate maps bear neither graticule nor scale). The Atlas includes also a 1:1M. topographic map of the country (divided into seven arbitrary sections). Mr. D. W. Mackenzie has written an admirable description of each of the sheets, drawing attention to the physique of the area mapped. The gazetteer is comprehensive.

The general standard of the atlas is so good that one hesitates to make a point of adverse criticism. The double page of small-scale maps of the country's Island Territories are regrettable. They are in a style out of keeping with the rest of the atlas, and are little better than those found in many a general world atlas.

It is to be hoped that the New Zealand Government, inspired by the success of the 'Descriptive Atlas,' will now vote money for the production of a true 'National Atlas,' which would be of great value to the country's planners.

E. M. J. CAMPBELL

THE MAP ROOM, BRITISH MUSEUM

The Map Room was in 1915 transferred from the south-east quadrant of the Iron Library to its present quarters on the mezzanine floor of the King Edward Building. Since then its only substantial accretion of space has been a section of the King Edward basement, where earlier editions of the Ordnance Survey large-scale plans have been stored. The growing volume of annual accessions (now treble that of 1939) and increasing use of the Map Room by students (1792 in 1949, 2715 in 1959) have hitherto been met by piecemeal adaptation of the available accommodation and furniture. To ease the last years of both students and staff in the present building, before the move to a scientifically planned Map Room in the new library to be erected south of Great Russell Street, a radical programme of internal reconstruction and re-equipment has been undertaken. Its objects are improvement of the working accommodation for students and staff, full utilization of the space available for storage, and modernization of the conservation methods for sheet maps.

This first phase of this operation is now complete. The accommodation for students has been doubled and has been segregated from the repository and from the staff work-rooms where unprocessed material is handled; a supervisor's desk has been constructed in the students' room; and the open-access reference shelves have been doubled in extent. The staff rooms have been arranged and furnished to facilitate the flow of work through the various stages of processing. All accessions of sheet maps are now stored in horizontal plan cabinets; and a start has been made in transferring to plan cabinets those sheet maps which (in many cases dissected and folded) were preserved in vertically stacked boxes—a system inherited from the nineteenth century. A standard type of double-elephant metal cabinet has been adopted for re-equipment of the repository, in which units will be built up to a height of eight feet or forty drawers, each drawer containing an average of 100 sheets. Five or six such units will accommodate the annual intake of sheet maps, running at its present rate. Equipment of this type will remain standard in the new library building.

The present complement of the Map Room comprises a deputy keeper as Superintendent (R. A. Skelton), an assistant keeper (Dr. Helen Wallis), two executive officers, four clerical officers, shorthand typist, library assistant, messenger and labeller. To a large extent the Map Room makes use of the common services of the Department of Printed Books, of which it is an administrative division; but the peculiar physical character of its material requires that all stages of processing be carried out within the division. For mounting, repair and binding, craftsmen on the staff of the Museum Bindery are assigned to the service of the Map Room, and a specially equipped shop for servicing of sheet maps is maintained. Among the more exacting tasks undertaken here since the war may be mentioned the cleaning and repair of the Hereford Map for the Royal Geographical Society in 1948, the repair and remounting of the original Ordnance Survey drawings (1956–9), and the reconstruction of the 264 guard-books of King George III's Topographical Collection (1953–60). The rebinding of the gigantic Klencke Atlas, presented to King Charles II in 1660 and believed to be the largest "super-atlas" (in Dr. Wieder's phrase) extant, has recently been completed.

Among the acquisitions of the decade 1950–60, two munificent gifts are of particular significance in the fields of hydrography and of topographical survey respectively. King George III's Maritime Collection, which had (by order of his successor) been detached from the King's Library in 1828 and presented to the Admiralty, was transferred to the Museum in 1844. Some seventy charts or sea-atlases, however, remained in the Admiralty Library; and in 1952 nearly half of these items, which had been identified there, were presented to the Museum by the Lords Commissioners of the Admiralty. This material included no fewer than four MS atlases by William Hack, among them his earliest 'Wagoner of the Great South Sea,' prepared for Charles II in 1682 (*BMQ*, XVIII (1953), 63–4). In 1956 the Director-General of the Ordnance Survey presented to the Museum the original drawings made in the earliest phase (1791–1824) of the trigonometrical survey of England and Wales, from which the first

edition of the one-inch-to-one-mile map was engraved. This collection, the principal surviving record of this survey, comprises 320 2-inch sheets, seventy-five 3-inch sheets and thirty-one 6-inch sheets, with fifty-nine packets of hill sketches and revision sheets made between 1819 and 1842. It provides a detailed representation of the English landscape some half a century before the large-scale plans of the Ordnance Survey, and its delineation of enclosures and cultivation gives it special value for the historical geographer (*BMQ*, XXI (1958), 59–61).

In the field of contemporary map production, the Museum's objectives are: (*a*) complete holdings of all cartographical material published in the British Isles; (*b*) Up-to-date topographical coverage of other countries on appropriate standard scales, not normally exceeding 1:50,000 (but in some cases 1:20,000); (*c*) a representative collection of general atlases; (*d*) all important special or thematic maps and atlases. Material published in the British Isles is received by deposit under the Copyright Act 1911; the output of British official map-producing agencies is presented; material published in other countries, if not presented, is obtained by exchange or purchase. Exchange arrangements are now in operation with ten countries, usually with the national library.

In a large general library the map room is necessarily the principal source of geographical intelligence. Since 1950 an effort has been made to develop on broad lines the open-access reference library of the Map Room, to which a sheaf catalogue (subjects and authors) has been prepared. Gazetteers, which were formerly placed in the General Library, now come to the Map Room.

Since 1954 a permanent exhibition of maps has been on view in the North Entrance of the Museum. In July 1953, as one of a series of exhibitions commemorating the bicentenary of the Museum's foundation, maps and atlases were displayed in the King's Library; this was probably the most extensive map exhibition ever set up in the British Museum. Among other exhibitions in which the Map Room staff have collaborated may be mentioned the Raleigh-Hakluyt exhibition, in 1952, and an exhibition entitled 'Prince Henry the Navigator and Portuguese maritime enterprise,' to be shown in September-October 1960.

The collotype facsimiles of Saxton's county maps, published by the Museum before the war, are now for the most part out-of-print. In their places coloured reproductions by photo-offset-lithography are being published, and nine county maps have been issued in this form.

R. A. SKELTON

EXPOSÉ DES TRAVAUX DE L'INSTITUT GÉOGRAPHIQUE NATIONAL, Années 1954–57. 100 *pages;* 56 *plates;* Année 1958: 41 *pages*, 46 *plates. Paris: Imprimerie de l'Institut Géographique National*, 1959

The Institut Géographique National is now responsible for virtually all control surveys and topographical mapping which is done in France and her overseas territories. It is also actively concerned with a wide range of miscellaneous activities in the fields of surveying and mapping. These reports describe work carried out in many different parts of the world during a most active period. The state of map cover, photographic cover and progress of different aspects of survey in each of the major territories is illustrated by means of coloured plates in each report.

In metropolitan France the basic 1:20,000 and the 1:50,000 (Type 1922) sheets are being issued at an increasing rate. Indeed, in 1958 alone, fifty-four sheets of the 1:50,000 map were published. Nevertheless the cover at this scale still only represents about half the total area of France and a number of years must elapse before complete cover is available. It may be noted that there are still some substantial gaps in the modern 3rd and 4th order triangulation of Brittany, Maine and Limousin. In 1958 the old 1:80,000 État-Major maps were withdrawn from sale and, in those parts of France for which no modern maps are available, these have been replaced by enlargements to 1:50,000 of the old survey with sheet lines corresponding to those ultimately intended for the Type 1922 maps. The new policy at least provides cover of the country at a constant scale on uniform sheet lines even if half the maps comprise enlargements of archaic material.

The new 1:100,000 (Type 1954) map has been rapidly introduced for northern and eastern France, already covered by reasonably modern 1:50,000 maps but, presumably, there will be a long delay in the completion of the sheets in this series for central and western districts.

The first of these reports is an especially important document in the history of French colonial cartography, because the whole of the period from 1945 is reviewed here with reference to the need for the Institut Géographique National to standardize the various methods and techniques which have hitherto been employed by the different local survey establishments. Noteworthy advances have been made in the French territories of West and Central Africa. Here the provision of vertical aerial photography, which had hardly begun in 1954, is now far advanced. Nearly 5½ million square kilometres of these territories have been photographed during the period covered by these reports.

The Institut Géographique National undertakes a remarkable variety of other tasks. For example, the photogrammetric mission to Uruguay in 1954, followed in 1956–7 by training courses in Montevideo sponsored by UNESCO, are described in the first report. Examples of some of the applications of photogrammetry undertaken at the I.G.N. include the evaluation of coal stocks at power stations, a study of the regime of the Mer de Glace between 1939 and 1958, the survey of the Temple of Abu Simbel in Lower Nubia before this is lost beneath the higher level of the Nile when the Aswan High Dam is completed.

Even today major corrections to existing maps remain to be reported. An example given in the first report is the disappearance of the mythical Tumuc-Humac mountains. These were first described more than seventy years ago by Coudreau as a continuous range forming the watershed between the rivers of French Guiana and the Amazon basin. A recent Franco-Brazilian boundary survey has shown that this area in fact consists of a mass of indefinite, low, forested hills. The name Tumuc-Humac is quite unknown locally.

D. H. MALING

OFFICIAL AND PRIVATE CARTOGRAPHY IN GERMANY

Official cartography in Germany is carried out by the Landesvermessungsämter, the survey institutions of the various Länder which form the Federal Republic of Germany. After the War and the dissolution of the former Reichsamt für Landesaufnahme, the main task of the Landesvermessungsämter was to preserve the cartographic materials of the Reichsamt and, in those cases where they were lost, to reproduce surviving copies of older maps. The Landesvermessungsämter retained the former scales of official mapping, *e.g.* 1:25,000 and 1:100,000. Taking into account that the old materials were outdated, and that national planning and economics required more specialized plotting, some of the Länder began the publication of base maps, called "Deutsche Grundkarte" at the scale of 1:5000, the production of which required new surveys in the field. The Deutsche Grundkarte has been the base for corrections of the maps on smaller scales, which led to the attempt to revise the 1:25,000 map. This revision offered the opportunity of separating the colours, and of reproducing coloured editions of this map. They show the isohypses in brown, situation in black, waters in blue and forests in green. Some editions add special colours for roads, or administrative boundaries. Especially well designed are some sheets published by Baden-Württemberg which show, besides the lines of equal heights, a plastic shading which has been photographed from relief models of the Wenschow firm in Munich. The age and bad state of the map on the scale 1:100,000 led to an agreement between the regional offices to create a new 1:50,000 map, each sheet covering four sheets of the 1:25,000 map. This new map is now in production, and each Vermessungsamt has published some sheets, with the exception of Schleswig-Holstein. This map is likewise in colours, at least four, with addition of red roads, and/or plastic relief. These sheets are the finest examples of German official cartography available at the moment, and are up to date. By interregional agreement the production of maps on the scales 1:200,000 to 1:1M. has been taken over by the Institut für Angewandte Geodäsie in

Frankfort, an agency of the Federal Government. At first there was a tendency to create a new 1:250,000 map instead of the former 1:200,000 and 1:300,000 maps (one sheet "Bremen" has been published). Practical considerations emphasized by geographers,[1] however, have tended to keep the scale to 1:200,000; no sheet has been published yet, but H. Knorr and F. Kranz [2] have submitted a set of examples for discussion, showing a great variety of colour symbols for different features. A decision about the final composition, however, has not yet been taken.

Private cartography in Germany is concerned mainly with school cartography (wall maps, atlases, school maps), road maps, tourist maps and similar items for special use. The lack of a suitable topographical map, and the needs of motorists, led to the publication of the 'Deutsche Generalkarte' 1:200,000, a map compiled and reproduced by Mair's Geographischer Verlag. The topographical content, based on the 25,000 map, has been revised in the field, especially the course of the main roads and the built-up areas. The colouring is soft and clear, with the relief in shading. This map covers the whole territory of the Federal Republic. Topical cartography shows great progress in the field of thematic atlas publication. The Länder began to publish sheets of regional atlases covering the whole thematical sequence. The regional planning boards of the Länder were responsible for the enterprise, the Akademie für Raumforschung und Landesplanung at Hanover being the initiator. The first complete volume concerned Niedersachsen; others deal with Schleswig-Holstein, Bayern and Hessen, and other volumes are in progress. The topics of the single sheets cover natural conditions, population, administration, economics, settlement and planning, and the material is based mainly on the communities (Gemeinden). The Institut für Landeskunde of the Bundesanstalt für Landeskunde und Raumforschung has elaborated some sheets on the scale 1:1M. covering the whole territory of the Federal Republic. These relate to distribution of population, regions of the different branches of administration, and land use. They are the first sheets of a projected atlas of the Federal Republic. Of special interest are the surveys of the Bundesanstalt für Vegetationskartierung at Stolzenau, and related institutions at Tübingen and Karlsruhe. The vegetation is plotted, partly by aid of aerial evaluation, according to the natural optimum of the areas, and given in phyto-sociological units. The areas investigated are natural units, as meadows, isles, or forests in the territory of Niedersachsen, or sheets of the topographical 1:25,000 map in Southern Germany. They are required for edaphological use in agriculture and forestry. A similar trend is shown by the inauguration of a 1:25,000 scale map of soil erosion conditions by B. Grosse and P. Schneider, of which a few sheets have been published. Another field for private cartography is town mapping. Among the great variety of town plans there are some outstanding productions of both private firms and municipal mapping offices. The plans for Hanover, Karlsruhe, Stuttgart, for example, are real maps showing relief by contours, and the functional importance of buildings as well as the use of the non-built up areas, vegetation, waters and the network of communications. It is not our task to mark the whole of the activity of private cartography in Germany. The trend in German cartography in general is towards the production of more elaborate, better designed maps with visual effects and clarity for general and practical use. E. MEYNEN

REVISING THE MICHELIN MAP

Attention has recently been drawn to an instructive and interesting paper by M. Bourdon-Michelin on the production of a new edition of the well-known Michelin

[1] Louis, H., "Über Kartenmasstäbe und kartographische Darstellungsstufen der geographischen Wirklichkeit," *Zeitschr. für Vermessungswesen* 1956, 7; R. Finsterwalder, "Zur alten und neuen Deutschen Topographischen Übersichtskarte 1:200,000," *Allgem. Vermessungsnachrichten* 1959, 8; E. Meynen, "Masstabhaltige Kartengruppen. Das geographische Bedürfnis nach einer Karte im Masstab 1:200,000," *Berichte zur deut. Landeskunde* Bd. 17, Heft 2.

[2] Knorr, H. and Kranz, F., "Studie über ein amtliches Kartenwerk im Masstab 1:200,000 oder 1:250,000," *Mitt. des Inst. für Angewandte Geodäsie*, Nr 17, Frankfurt M. 1956.

road map of France. ("Histoire d'une carte routière," *Mem. de la Société des ingénieurs civils de France*, **105** (1952) 309–38.) This describes not only the arduous work of documentation and compilation, but recent developments in preparing and producing the map itself, notably the use of scribing and of the photo-mechanical techniques which have replaced lettering by hand. An edition of the Carte Michelin de France was published in 1922, and by 1950 it was apparent that no further alteration or touching-up of the plates was possible; consequently, after extensive research, the whole map was redesigned and thoroughly revised. Despite the demands of many users, it was decided to retain the scale of 1:200,000 but other requests for greater legibility and for the representation of the true width of roads, and not the "administrative width," were met. Complaints about the sheet lines were also received, but here general considerations prevailed over local convenience. Paris, very sensibly, is placed at the junction of four neighbouring sheets. After experiments, it was found that relief could not be represented without producing an illegible map; moreover, experience had shown that it prevented continuous revision of the plates. Formerly, all names and many features were shown in black, but to emphasize the important details, many are now printed as a greyish background. The choice of suitable colours also necessitated many trials to secure the right balance, with a slightly ochre-tinted paper.

The choice of names was also rigorous, and approximately ten per cent. only of all place-names and "lieux-dits" could be included. To clear the map further, small circles have been substituted for the plans of small settlements, and the symbol for level crossings omitted. The separate symbol for a church is used only where the visitor can expect to find reasonable facilities for obtaining supplies. The service for documentation of the map receives some 50,000 communications each year. In preparing the new edition, each of the 2500 engineers of the "Ponts et Chaussées" was personally interviewed and questioned, and many enquiries on places of interest to tourists were circulated. Finally, much of the data was obtained by officers motoring over the routes and dictating to a tape-recorder. The compilation and documentation of each sheet occupied about eighteen months. The producers of the Carte Michelin have clearly acted on the injunction which should continuously be in the minds of all cartographers, "Tout ce qui est inutile est nuisible." G. R. CRONE

A GERMAN REFERENCE ATLAS

The atlas volume of the new edition of 'Der Grosse Brockhaus' (*Wiesbaden*, 1960; 9½×6 *inches*. *Price* £7 15*s*) is arranged in five sections; the first presents numerical and statistical information about the world and mankind by a variety of graphical methods; part two is the cartographical section proper—280 plates in colour, many double-page, which cover topography, geology, vegetation, climate, anthropology and economics for the major regions. The third section is a striking collection of plates illustrating typical land forms, settlement patterns and human activities. This is followed by a small group of historical maps with some interesting themes, *e.g.* the spread of Western knowledge of the world, the territorial splintering of pre-Prussian Germany, and folk movements and state building in Africa. Finally there is an index to the maps, containing approximately 55,000 entries. These include cross-references from the present Russian and Polish names of places, in areas administered by the U.S.S.R. and Poland, to the German names. The main maps are layer coloured for relief, while most of the regional maps show relief effectively by hill shading in a pleasant tone of brownish grey which does not interfere with other detail. The dimensions of the volume do not allow the general maps to be on large scales; Germany and much of Central Europe, however, are at 1:1·25M., with regional maps up to 1:550,000. Sections of the United States are at 1:4M. The detail appears to be, in general, up-to-date, but one does not find the new capital of Brazil—Brasilia. The volume, being designed to accompany a German encyclopaedia, has its limitations for English students, but nevertheless should be in all reference libraries. G. R. CRONE

MAP SUPPLEMENT TO THE ANNALS OF THE ASSOCIATION OF AMERICAN GEOGRAPHERS

In April 1957 the Council of the Association of American Geographers approved a Map Supplement to the *Annals*. The object, as stated in the *Annals*, **48**, 1 (March 1958), is to provide a publication outlet "for the cartographic portrayal of geographic data on a format larger than the *Annals* page size. The Council is convinced that maps dealing with particular areas or subjects can be made to stand alone, requiring little or no explanatory text."

Map Supplement No. 1 of the above series, "Cyprus: a landform study," accompanies the March 1960 issue of the *Annals* (**50**, 1). This supplement (14 × 19 *inches*), printed in full colour, is the work of Dr. Norman J. W. Thrower of the University of California, Los Angeles. It consists of six maps on one sheet. The largest and most novel of these, drawn on a scale of 1:750,000, depicts terrain types. There are four smaller maps entitled "General reference," "Hypsometry," "Percentage of land in gentle slope" and "Relative relief." In addition, there is a short explanatory note and a location map.

On the "Terrain" map four land form types are distinguished and demarcated: mountains, hills, rolling and irregular plains, and nearly level plains. These land form types were quantitatively determined and represent groupings of categories from the "Slope" and "Relative relief" maps. As explained in the note, the data for these two maps were obtained principally from the Cyprus 1:50,000 G.S.G.S. 1942 topographical sheets by the examination of unit areas. The maps of the land surface of Cyprus were subdivided into units of 5 × 5 kilometres, each of which was evaluated in terms of its relative relief, taken as the difference in elevation between the highest and lowest points. Categories were then selected and an isopleth map produced. The same procedure was followed in the compilation of the map of the percentage of land in gentle slope, *i.e.* land in unit areas with 8 per cent. slope or less. Other physiognomic properties of terrain were taken into account so that the land form map is a summation of significant land form elements.

Besides showing the extent of quantitatively determined terrain types, the largest map, of chorographic scale, illustrates the character of the relief of Cyprus by means of "plastic shading." This rendering permits the form and orientation of major and minor land forms to be appreciated and enlivens the map. The hypsometric map permits comparison between the conventional method of relief representation and the new map of terrain types. The use of pastel colours on the map allows the distribution of terrain types to be combined successfully with the relief shading. Several departures from normal cartographic convention serve to give this map an unusual and pleasing appearance. The normal hypsometric tints have been abandoned in favour of a colour scheme in which yellow is used for the lowest altitudes, progressing through orange to purple. The absence of lines separating colours in three of the maps has the merit of not over-emphasizing zones of change. Both the typography and the printing are of high quality and this first Map Supplement is as artistic as it is scientifically based. This interesting venture has clearly started well, and it is understood that more maps are in preparation which will continue to display the cartographic skill and initiative of our American colleagues.

W. GORDON EAST

THE SOCIETY'S NEWS

BIRTHDAY HONOURS LIST

The Birthday Honours List includes the names of Percy Llewellyn Hunting, Chairman of the Hunting Group of Companies, and Henry Gerald Thornton, Foreign Secretary of the Royal Society, who become Knights Bachelor; and of John Bartholomew, Chairman of John Bartholomew and Son Ltd., who is created C.B.E.

NEW MEMBERS OF COUNCIL

At the Annual General Meeting of the Society on 13 June 1960 the following changes and elections to Council were made: Mr. G. P. Pirie-Gordon becomes Honorary Treasurer in place of Mr. Leonard Brooks, and Lieutenant-General R. G. W. H. Stone replaces the Baroness Ravensdale as a Vice-President. Of the ten new Members of Council, seven will serve for the first time: namely Brigadier A. E. Dowson, Mr. Charles Evans, F.R.C.S. (elected to Council in 1959 but unable to take up office), Rear-Admiral E. G. Irving, Sir Gilbert Laithwaite, Mr. Brian F. Macdona, Mr. E. C. Marchant, Captain G. S. Ritchie, R.N. Professor H. C. Darby served on the Council from 1941–44, Dr. Alice Garnett from 1952–5 and Mr. A. R. Glen from 1945–7 and again from 1954–8.

Of those who have not served before, Brigadier A. H. Dowson is the Director of Military Survey. Rear-Admiral E. G. Irving succeeds Rear-Admiral K. St.B. Collins as Hydrographer of the Navy. Sir Gilbert Laithwaite, recently Permanent Under-Secretary of State for Commonwealth Relations, is a Trustee of the Hakluyt Society and an Honorary Fellow of Trinity College, Oxford. Mr. Brian F. Macdona is General Manager of Barclays Bank, D.C. & O., Lombard Street. Mr. E. C. Marchant is an Inspector in the Ministry of Education, Leicester. Captain G. S. Ritchie, R.N., is a Deputy Hydrographer of the Navy.

The Rt. Hon. Lord Rennell of Rodd (Past President), Sir James Wordie (Past President) and Mr. Leonard Brooks, were designated Honorary Vice-Presidents under the Amended Bye-Laws, as passed at the Special General Meeting on 13 June 1960.

APPLICATIONS FOR GRANTS FOR EXPLORATION AND RESEARCH 1961

Applications for grants for both exploration and research must reach the Director and Secretary not later than **13 February 1961**; it is only in very exceptional circumstances that later applications can be considered. Applications must be *typed* on the Society's own form which can be obtained on request; they must be accompanied by evidence of support from institutions or qualified individuals supporting the proposed expedition or research. Leaders of expeditions and other applicants for grants may be expected to attend an interviewing board.

WOLFSON FOUNDATION GRANT FOR EXPLORATION

The Royal Geographical Society has received from the Wolfson Foundation a grant of £10,000 to be spread over four years, for the support of exploring and scientific expeditions. These expeditions, in accordance with the Society's policy of encouraging exploratory enterprise and scientific training among young people, come at present mainly from the universities. The Wolfson Foundation Fund will enable the range of this support to be extended considerably.

BRITISH ACADEMY ELECTION

Lord Nathan, President of the Society, has been elected to Fellowship of the British Academy under the Supplemental Charter recently granted to the Academy by Her Majesty The Queen.

ROYAL GEOGRAPHICAL SOCIETY RESEARCH FELLOWSHIP

Dr. P. Salway, Fellow of Sidney Sussex College, Cambridge, has been awarded a Royal Geographical Society Research Fellowship for research on the geography and topography of the Roman Fenland. During past years the progressive desiccation of the Fenland has revealed an extensive system of Romano-British farms and settlements, with associated field-systems, droveways and water-courses, both artificial and natural. Continued desiccation will obliterate most of these before the end of the century. There is no part of the surface of Great Britain where the details of an ancient landscape can be so completely recovered as in the Fenland and one product of Dr. Salway's research and field-work will be a detailed map of the region as it was in Roman times. The Fellowship has been established by the Society with the aid of a grant of £600 from the Marc Fitch Fund.

U.S.S.R. RECOGNITION OF DARWIN CENTENARY

To commemorate the centenary of the death of Charles Darwin the Government of the U.S.S.R. struck a special bronze medal. This was awarded on 23 May 1960 at the Soviet Embassy to various learned societies and universities with which Darwin was connected, as well as to surviving members of his family. In the absence abroad of the President, Sir James Marshall-Cornwall (Immediate Past President) received the medal on behalf of the Society.

THE RECORD

CONTRIBUTORS TO THIS ISSUE OF THE *JOURNAL*

J. H. Andrews is lecturer in geography at Trinity College, Dublin. *Professor W. H. Parker* is associate professor in geography at the University of Manitoba. *Sir Olaf Caroe* was Secretary to the External Affairs Department of the Government of India from 1939 to 1945 and Governor of the North-west Frontier Province from 1946 to 1947; he dealt with the affairs of the North-east Frontier along the Himalaya over a period of ten years under three Viceroys, and has had occasion to maintain interest in India's frontier problems after 1947. *Lieut. Commander C. J. C. Wynne-Edwards*, R.N., spent the two seasons 1956–7 and 1957–8 in command of the Royal Navy Hydrographic Survey Unit in Graham Land waters. *Dr. C. Embleton* is on the staff of the Geography Department, Bedford College, London. *H. E. Henoch* is on the staff of the Geographical Branch of the Department of Mines and Technical Surveys, Ottawa.

UNIVERSITY NEWS

University of New England, N.S.W.

On April 30 the new buildings housing the department of geography were officially opened by Professor Griffith Taylor. The new home of the department forms half of an imposing group of buildings devoted to geography and geology, and occupies the highest part (3400 ft.) of the rural campus. It contains the largest lecture theatre of the University, laboratories, seminar and research rooms, map library, cartography room and a full suite of individual staff rooms. The opening was also attended by Professor W. R. Browne, of Kosciusko fame, and Professor L. A. Cotton, after whom the school of geology is named. The octogenarian Professor Griffith Taylor delighted the audience with his usual verve and devotion to geographical science; and, as a permanent reminder of the occasion, he donated to the Department several of his Antarctic "relics," including one of Scott's instructions to a sledging party.

The staff, the largest of any department of geography in the continent, has been augmented by the arrival of two new lecturers, Mr. J. H. Holmes, M.A. (Sydney), and Mr. B. G. Plummer, M.A. (Wales), the former assisting with human studies, the latter

developing a series of biogeographical courses. Dr. J. S. Duncan, of the University of Manchester, has inaugurated a scheme of annual visiting lecturers, whereby the department will receive a regular infusion of useful academic contacts from overseas, and the visitor an opportunity to travel in Australia. Two additional demonstrators, Mr. R. J. Warner, B.A. (Birmingham), and Mr. P. Smailes, B.A. (Manchester), have brought the total teaching establishment to thirteen members. Two of the latter are on study leave in 1960, Mr. E. Woolmington, based on Birkbeck College, and Mr. E. C. Chapman on Ohio State University, Columbus.

Research work is continuing on New South Wales "North coast rivers," Mr. E. W.R. Thorpe, senior lecturer, investigating flood characteristics in relation to land utilization, Mr. I. Davis and Mr. R. Warner geomorphological aspects, and Professor Butland the evolution of settlement in the Bellingen valley. A cooperative field-work mapping, by third-year students, of land use in the Clarence valley, has been completed and will be published as a departmental memoir. Senior lecturer Dr. H. W. King is concentrating on urban studies of the new settlements of Australia's Gold Coast and the problem of secondary industries in Australia's country towns. Mr. R. Golledge's work in the same field is partly dealt with in his recent paper on "Sydney's urban-rural fringe," [1] and his M.A. thesis on Newcastle's commodity flow is nearing completion. A joint research project between the department and the faculty of rural science, assisted by a substantial financial grant from the Australian Dairy Produce Board, is investigating various climatological effects on dairy production on the north coast of N.S.W.

Mr. I. Davis has completed his McGill University M.SC. thesis on "Periglacial limestone morphology—a study of part of Southampton Island, N.W.T."; other post-graduate studies range from the Illawarra to the new wheat-growing districts of the Central Highlands of Queensland.

The visiting lectureship referred to above, and inaugurated by the appointment of Dr. Duncan, is to be filled each year by a lecturer from overseas. The department invites applications for 1961, and draws attention to the twofold objects of the appointment. First, that the holder of the lectureship should have an opportunity of travel in and personal contact with eastern Australia, and secondly that the department should benefit from the infusion of new ideas and methods, and the stimulus of academic exchange. Full particulars may be obtained from Professor G. J. Butland, Department of Geography, University of New England, Armidale, N.S.W. G. J. BUTLAND

ABSTRACTS OF GEOMORPHOLOGY PAPERS

A group of university teachers are planning to produce a series of abstracts of papers concerned with geomorphology. It is intended that these will be compiled four times a year, duplicated and then circulated, and a charge of 4*s* (16*s* a year) will be made. Full reference to the source of every abstract will be included, and the aim of this new venture is to keep subscribers informed of new papers in this field. Those interested should write to Dr. K. M. Clayton, London School of Economics, Houghton Street, Aldwych, W.C.2.

BOUNDARY BETWEEN EUROPE AND ASIA

A recent number of the *Central Asian Review* (No. 3, 1959) contains a statement from a Soviet source on the boundary between Europe and Asia. The extract runs as follows:

"At a meeting in 1958 of the Moscow section of the All-Union Geographical Society, it was recommended that the border between Europe and Asia should be drawn along the eastern foot of the Urals, the Mugodzhar Mountains, the Emba River, the north shore of the Caspian, the Kumo-Manych depression and the south coast of the Sea of Azov to the Kerch straits. Thus the Urals lie wholly in Europe and the Caucasus wholly in Asia. The Sea of Azov belongs to Europe. This boundary will be shown in all Soviet maps and geography text-books."

[1] *The Australian Geographer*, 7, 6 (February 1960).

Reference to this statement will be found in "Europe, how far?" by W. H. Parker on p. 291 of this issue.

THE TIBET SOCIETY OF THE UNITED KINGDOM

The Tibet Society of the United Kingdom was founded on 4 June 1959. The Society, of which the address is 58 Eccleston Square, S.W.1, has issued a statement of its aims and constitution, and membership is invited. Full particulars may be obtained from the Honorary Secretary of the Tibet Society at the above address.

HISTORICAL BACKGROUND TO LIVINGSTONE'S JOURNEY THROUGH LAKE BANGWEULU: 19 FEBRUARY–24 MARCH 1873

Dr. Livingstone visited Lake Bangweulu twice. The first occasion was in July 1868 when he went to Mbabala Island. The second occasion was just before his death. He then went to Nsumbu Island. The main purpose of this note is to sketch the historical background to his visit, but I also wish to suggest the identity of the camp where the explorer's party stayed immediately prior to his embarkation on the lake; that is, between 19 February and 1 March 1873. I intend basing this identity largely on the historical events of the time.

When Livingstone arrived at the country north of the lake the military aggression of the Bemba tribe was at its height. Throughout what is now the northern province of Northern Rhodesia the smaller tribes were being harried by the well-armed Bemba warriors, anxious to keep their Arab allies well supplied with slaves. One of these smaller tribes was the Bisa, a people who now inhabit several of the islands in Lake Bangweulu, and also occupy an area on the north shore of the lake. Their chief was Muma Ndila, and this was the man whom Livingstone was anxious to contact. Ndila had a great flair for bestowing nicknames. It was he indeed who gave the position of chieftain which he occupied its first traditional name—Matipa, which means mud. It was by this name that he was known to Livingstone, and this name has been handed on to his successors. Its origins are obscure but one old member of the tribe told me that it was because he boasted that the blood of his enemies stuck to him like mud. Some years prior to his visit to Bangweulu this Matipa had decided to make a last stand against the onslaughts of the Bemba and he built a stockade on the north shore of the lake which he called Chaba. This means literally "let it be"—the sentiment being that this would stand against any Bemba attack. This was a boast which was not easy to maintain against the Bemba who were now at their most powerful. The Bemba came, and they were led by their paramount chief—Chitapankwa—the pioneer of Bemba militarism. This was the same Chitapankwa who had been host to Livingstone in January–February 1867. The Bemba failed to break into the stockade, but Matipa decided to return to the lake islands. He went to Chilubi (Livingstone's Chirube), but a revolutionary movement was afoot led by one Yombwe, a distant relative of Matipa, and the latter was driven to Nsumbu (Livingstone's Masumbo). This was the reason why Livingstone was surprised to learn that the chief was not on Chilubi, but on Nsumbu. This revolutionary movement is clearly what Livingstone refers to in his entry on February 26 when he writes: ". . . Matipa is at variance with his brothers on the subject of the lordship of the lands and the produce of the elephants . . ." It is this same struggle which makes the people afraid of "being killed by some hostile people on another island between this and Matipa's." (February 21.) The "other island" is Chilubi where Yombwe had established himself, but Livingstone, supposing quite justifiably that Matipa is on Chilubi, assumes that the people are referring to a third island. Matipa is anxious to subdue Yombwe, and this is the reason for his attempts to detain Livingstone, for the association of the explorer with his cause would be a considerable boost. Livingstone discovered this on March 17 when Matipa tells him that he "will attack all the Lake people forthwith."

The position was then that Livingstone arrived just after Chitapankwa's attack on Chaba. I consider that Livingstone stayed in Chaba. He says clearly on February 19

that he "camped in an old village of Matipa's." Chaba is the only old chief's village near the lake, and certainly the people would remember that only very recently had Matipa left there. Another important statement is that "in the west we see the Luena enter Lake Bangweulo." One cannot see this clearly from Chaba, but a statement from an inhabitant to the effect that Luena is to the west (or rather north-west) and very near, would be quite accurate. C. H. I. Rawsthorne, in the *Northern Rhodesia Journal*, **2**, 6 (1955), postulates that the camp, and point of embarkation, was near the modern village of Chabukasanshya about five miles west of Nsombo. But it seems to me that this falls down for two reasons. The first is that this village and the area round was not in the Bisa area, nor could it have been, therefore, an old village of Matipa's. The second is that Chabukasanshya is to the west of the Luena, so that to see the river Livingstone would have had to look to the east, not to the west. Professor Frank Debenham agrees with Rawsthorne's theory largely as I read it, because of the fact that one of the principal canoe routes to the islands starts near Chabukasanshya. But there is an equally important canal from Chaba, and this canal would also bring Livingstone's party to the several islands where "people are drying fish over fires." Another point is that the Chaba channel would have kept him well away from the open lake, which he did not see on this journey, whereas the Chabukasanshya channel would almost certainly have brought him en route to the open lake. Three hours' punting from Chaba would bring him to the fishing islands, and a further seven and a half hours would bring him to Matipa's stockade which was on the site of the present Nshimbo village on the north side of the island. There he was to meet with considerable frustration, and also to perform one of his most dramatic gestures—that of firing a pistol through the roof of a hut to force Matipa to help him. This proved effective and the explorer went on the last stage of his journey to Ilala.

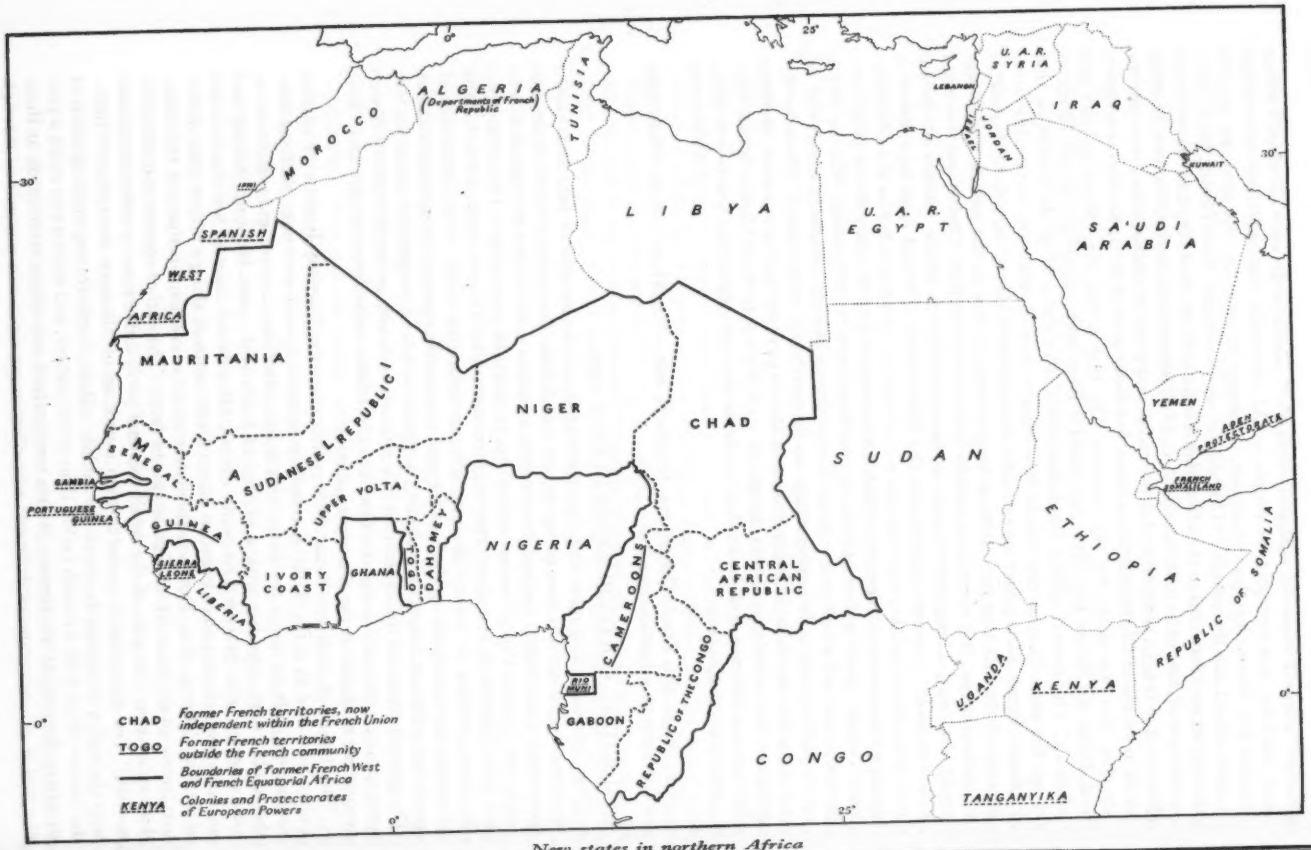
Abercorn, N. Rhodesia J. E. THOMAS

Note:—See also Frank Debenham, *Geogr. J.*, **120**, 1 (1954), p. 1 *et seq.* "New light on Livingstone's last journey."

CAMBRIDGE COLOMBIA EXPEDITION 1959

The Cambridge Colombia Expedition of 1959 spent the months of July and August studying a little-known part of north-east Colombia. Two parties were engaged in geological, glaciological and mountaineering activities in the Sierra Nevada de Cocuy while the "Jungle Party," composed of two 21-year-old geographers, David Stoddart and John Trubshaw, and an interpreter, investigated the Tunebo Indians who inhabit the lower reaches of valleys draining the north-eastern flank of the same massif. Observations were made on the house types, on manufactures and implements and on social and religious practices, including a lengthy study of an unusual dance festival. The general report of the expedition was referred to briefly in the *Journal* for March 1960 (p. 113); the special report on the Tunebo Indians also deserves comment. Both reports are available in the Society's Library.

This report is entitled "Uua: Observations on the Tunebo Indians of eastern Colombia," and in it the Tunebo economy receives special attention. Shifting subsistence agriculture forms the basis with maize, plantains, cassava and sugar-cane as the staple crops, together with a variety of fruits and roots. Hunting, fishing and collecting are also practised to some extent. Of especial interest are the seasonal migrations which take place between three villages situated along a fifteen-mile stretch of the Rio Cobaria. The Tunebo explanation of the movements is that it is their duty to cultivate all the lands which God has given them. The author appears satisfied with this explanation "because of the small seasonal [*sic!*] differences in temperature and rainfall." Yet according to a sketch-map a prominent "Eastern escarpment" intersects the valley immediately above the middle village; furthermore, maize is sown at the lowest village fully a month earlier than at the highest, and indeed two crops a year are often obtained at the former. As no temperature recordings were made at these sites and as no indication of differences in effective precipitation was gained through



New states in northern Africa

observations of the types of vegetation, the importance of variations in climate from place to place cannot be assessed. It seems even more unfortunate that the services of the other members of the expedition were not available for making a survey of the relevant types of soil and land form.

Investigations were also made into the recent changes in the Tunebo economy and the development of the area. Settlers from west of the Cordillera have arrived, sometimes occupying native clearings. Because of transport difficulties coffee is their only commercial crop and they depend for subsistence on the same crops as the Indians. The reason for the migration into this remote valley lies in the civil strife which has afflicted the countryside for over a decade (and which in fact is partly responsible for the remarkable growth of industry through migration to the cities).

The activities of missionaries are also leading to change. A school and farm have been established, the interplanting of bananas, cassava, coffee and cacao is under study and cattle breeding has been introduced. Nearby is a new village in which converted Tunebos are encouraged to settle. Finally, a motor-road from Pamplona is advancing steadily into the area with its threats of commercial agriculture and colonization.

The Cambridge expedition has been most fortunate in having the opportunity of visiting the Tunebo country and of describing the economy and customs of its people at this crucial stage in their history. We are therefore indebted to Mr. Stoddart and Mr. Trubshaw for their study of this hitherto little-known tribe which may soon lose its cultural identity.

J. COLIN CROSSLEY

NEW STATES IN NORTHERN AFRICA

The accompanying sketch-map is designed primarily to show the new constitutional status of the former French colonial territories in Central and West Africa as at July 1960. The heavy black line demarcates the former French colonies, Afrique Équatoriale Française and Afrique Occidentale Française. These are now grouped into two classes, those which are independent republics within the French community, and those which have opted out of the French community; the former, indicated by Roman capitals, are Mauretania, Mali—formed by a Federation between Senegal and the Sudanese Republic—Upper Volta, Ivory Coast, Dahomey, Niger, Chad, Central African Republic, Gaboon and Republic of the Congo. In the second class (names underlined) are Guinea and two territories formerly held by France under Trusteeship. The names of other independent sovereign states are in italic capitals. Included with these are the two former British colonial territories, now independent but within the British Commonwealth of Nations, the Republic of Ghana (formerly Gold Coast) and the Federation of Nigeria. In north-east Africa, the Republic of Somalia has been formed by the union of British Somaliland and Italian Somaliland, which was held by Italy under Trusteeship for the United Nations. The names of colonial territories of European powers are underlined by broken lines. The British territories, Uganda, Kenya and Tanganyika, with Gambia and Sierra Leone, are at various stages in the transition to self-rule. It should also be noted that in some instances the boundaries as shown on the map are undemarcated or are subject to further negotiations between the countries concerned.

G. R. CRONE

New states in northern Africa

NOTES

A preliminary announcement has been received from the Pacific Science Association about the TENTH PACIFIC SCIENCE CONGRESS. This is to be held at the University of Hawaii, Honolulu, from 21 August to 6 September 1961, and enquiries should be addressed to the Secretary-General, Tenth Pacific Science Congress, Bishop Museum, Honolulu 17, Hawaii, U.S.A. Section VII (Geography) will be divided into four divisions: Cartography, Physical geography, Human geography and Regional geography: The Pacific Islands.

* * *

Don, the journal of the Sheffield University Geographical Society, published its fourth annual number in April 1960. The editor, B. E. Walsh, is able to report that *Don* is "firmly established, both in a literary and a financial sense," and the nine papers in this number show a wide reach of interest. All except an account of Arctic field-work deal with subjects within the U.K., but they are mostly of more than local interest. *Don* is well produced with neatly set out references and clear line drawings.

* * *

A prize of £50 will be awarded for the best paper submitted to the FIELD SURVEY ASSOCIATION on or before 31 December 1960 on one of the following subjects: (i) The application of electronic equipment to field surveying; (ii) Photographic techniques as an aid to surveying and mapping; (iii) The surveyor in scientific expeditions. The rules of the prize, and the conditions of membership of the F.S.A., can be obtained from the Honorary Secretary, Award Committee, Field Survey Association, Survey 1, The War Office, Whitehall, London, S.W.1.

* * *

OBITUARY

JAMES PHILIP MILLS, C.S.I., C.I.E.

1890–1960

Philip Mills, who died on 12 May 1960, was educated at Winchester and Corpus Christi College, Oxford, where he acquired an interest in anthropology which was to remain dominant throughout his life. When in 1913 he entered the Indian Civil Service he opted for service in the hills of Assam, and there he found in J. H. Hutton a senior colleague imbued with the same enthusiasm for the study of tribal cultures. In 1917 he took charge of the subdivision of Mokokchung of the Naga Hills District, and this gave him his first opportunity for an intensive study of a tribal society. At that time officials were not yet over-burdened by paper work, and much lengthy touring on foot enabled Mills to acquire an intimate insight into the lives of the people in his charge. In 1936 I had the good fortune to accompany him on several tours and to watch him administer justice in a rough and ready, but always fair and conscientious, way whenever litigants collected in his camps. There was no doubt that the tribesmen trusted and liked him, and that his knowledge of customary law equalled that of the most experienced of village-elders. Mills's sympathetic and unbureaucratic approach to the Nagas and their problems suited the administration of a loosely controlled frontier-region to perfection. Two monographs, 'The Lhota Nagas' (1922) and 'The Ao Nagas' (1926), were the first fruits of his research in the Naga Hills. They are classics of ethnographic writing, and when Mills was posted to Kohima as Deputy Commissioner he added to these an equally valuable volume entitled 'The Rengma Nagas' (1937).

While serving in the Naga Hills District, he repeatedly had occasion to enter the unadministered tribal area then extending between Assam and Burma, and several of his tours represented the first exploration of territory which was right off the map and had never before been visited by Europeans. Though of gentle and quiet temperament, Mills showed on such occasions great personal courage, indifference to discomfort and a physical toughness which put to shame men many years his junior.

Mills's extensive knowledge and life-long experience of the hill tribes made him an ideal choice for the post of Adviser to the Governor of Assam for Tribal Areas and States, which he held from 1943 until 1947. In this capacity he laid the foundation for the administration of what is now known as the North East Frontier Agency, and it was due to his initiative that, wherever possible, the extension of administrative control over the Himalayan regions immediately south of the McMahon Line was combined with

the collection of ethnographic data. During the critical years 1944 and 1945, when Assam was threatened by the Japanese invasion, much determination was required to obtain funds and resources for the exploration of such areas as the Subansiri and Lohit regions, which in those days seemed remote from the major spheres of political interest. Today the Government of India, faced with a Chinese claim to these very regions, owes a debt of gratitude to J. P. Mills, who was instrumental in establishing the first outposts and administrative centres in an area previously considered *terra incognita*.

When Philip Mills retired from the Indian Civil Service, he was able to devote himself entirely to his anthropological interests. He joined the School of Oriental and African Studies and in 1947 was appointed Reader in Language and Culture with special reference to South-east Asia in the University of London. He also played an active part in the work of the Royal Anthropological Institute and held the position of President from 1951 until 1953.

Mills was a Fellow of the Society from 1925 to 1955 and served on the Research and Expeditions Committee from 1948 to 1953; he was a member of the Permanent Committee on Geographical Names from 1949 to 1954. He married Pamela Vesey-Fitzgerald in 1930, and is survived by his widow and two daughters. C. VON FÜRER-HAIMENDORF

MEETINGS: SESSION 1959–60

Meeting of 11 April 1960. The President in the Chair.

Elections to Fellowship: Robert Cummings; Miss E. Frances Haywood, B.A.; Dr. Otto Lampel; George A. Manley; Harold Radage; Roger A. Redfern; John Slimming; T. R. Stauffer, B.SC.; Ronald Whitaker

Election to Associate Membership: I. H. Angus

Paper: Art and Society in New Guinea. By Anthony Forge

Meeting of 25 April 1960. Sir James Marshall-Cornwall in the Chair

Paper: The Ordnance Survey and archaeology. By C. W. Phillips

Meeting of 2 May 1960. Sir James Marshall-Cornwall in the Chair

Elections to Fellowship: Jack Aitken; Thomas L. Murphy; Simeon B. Ogbonna, M.A.; Andrew H. Osei; Philip J. Rivers; Brigadier R. O. Spence, C.B.E.; Miss Millie Taplin; Denys W. Thomas

Paper: The geography and peoples of the Himalayan and Karakoram Frontiers. By Sir Olaf Caroe, K.C.S.I., K.C.I.E.

Meeting of 16 May 1960. Dr. E. W. H. Briault in the Chair

Film: Forgotten Island. The film of the Oxford Expedition to the Island of Socotra in the Indian Ocean

Meeting of 23 May 1960. Professor J. A. Steers in the Chair

Paper: Jebel Marra Darfur and its region. By Professor J. H. G. Lebon and V. C. Robertson

Meeting of 30 May 1960. The President in the Chair

Elections to Fellowship: Capt. M. M. I. Beggs; Thomas A. Broster; Capt. A. D. J. Cameron; Miss M. Corbett; Colin C. Cuff; F. B. Hampson; Brian Haworth; John S. Hoyle; M. A. Kulukundis; Nicholas G. Lee; Rev. Peter U. Louw; Capt. I. S. McLean; Miss L. Joyce Miles; Brian Newbery; James J. Phelan; Leonard K. Pilling; David J. Shave; Basil J. Shepstone; Mrs. I. M. Simmons; Brian E. Trump; James M. Vellacott; Giles A. K. Vincent; Mrs. Margaret Wood

Henry R. Colton; A. B. Falodun; L. S. Gifford-Gifford; Lt. G. A. F. Hitchens; Douglas Greenfield; Mrs. D. G. Holroyd; Frederick B. Hughes; A. N. Ingham; Field-Marshal Sir Shamsher Kaiser; Tahir Khan; Miss Laura Lee; Miss M. B.

McHugo; Miss M. I. F. Markes; George D. Massey; John W. Matthew; Miss Anne H. Morris; Charles W. Risdon; M. C. Roberts; Charles J. Robertson; Major R. D. Shepherd; Nirmal C. Sinha; Hubert J. Smith; Edgar R. Terry; Kenneth E. Tomkinson; William D. G. Toye; Derick Turner; Miss Joan Turner; Miss Stella Turner; Miss Joyce Watson; Rev. Charles E. Webber; Miss Margaret Williams

Elections to Associate Membership: David C. Bray; Richard M. Burt; Miss J. E. Harrison

Paper: An ancient metropolis of the North-west Frontier: recent work at Charsada. By Sir Mortimer Wheeler. The Dickson Asia Lecture 1960

SPECIAL GENERAL MEETING, 13 June 1960. The President, the Rt. Hon. LORD NATHAN in the Chair.

At a Special General Meeting, held on 13 June 1960, with seventy Fellows present, the following principal amendments were unanimously approved for incorporation in the Bye-Laws:—

1. An increase in the number of Vice-Presidents from six to seven, the Immediate Past President becoming *ipso facto* a Vice-President. To take affect from June 1961.
2. The abolition of the office of Trustee and the temporary incorporation of the two existing Trustees as Vice-Presidents, as from June 1961, making a temporary total of nine Vice-Presidents.
3. From June 1961, two Vice-Presidents to be changed each year; three to be changed until the existing Trustees have ceased to be Vice-Presidents under (2) above.
4. No Honorary Secretary and no Honorary Treasurer to be eligible for election if aged 75 years or over, or if he or she shall have held office for a period or periods amounting in aggregate to ten years. No Vice-President to be eligible for election if he shall have attained the age of 72 years.
5. The Council to have the right to select one or more Fellows as Honorary Vice-Presidents. Every Past President other than the Immediate Past President to be *ipso facto* an Honorary Vice-President.
6. The Chairmen and members of the Committees of the Council to be nominated in future by the Council and not by the President.

In the course of his Presidential Address, Lord Nathan spoke of the changes to be made as a result of the acceptance of the amendments and gave the names of the new Honorary Vice-Presidents of the Society (see p. 266).

ANNUAL GENERAL MEETING, 13 June 1960. The President, the Rt. Hon. LORD NATHAN in the Chair.

The HON. SECRETARY, Dr. Edward Hindle, F.R.S., read the Minutes of the Annual General Meeting held on 15 June 1959; these were confirmed, and signed by the President.

The President then delivered his Presidential Address which is printed at pages 261–7.

The PRESIDENT: I now turn to the most important item on our agenda for this afternoon, the presentation of the Royal Medals and other Awards.

The *Patron's Medal* for this year is awarded to Professor Théodore Monod, for geographical exploration and research over many years in the Sahara. Professor Monod, who is here today, I am glad to say, to receive this award personally, is a man of many parts. He is Professor of Ichthyology in the Musée de l'Homme in Paris, and he is also director of the Institut Français d'Afrique Noire at Dakar. He is a member of the French Academy of Sciences. Despite the title of his Chair, Professor Monod is essentially a geographer, and a geographer in the widest sense. Indeed, the great breadth of his interests has been most striking—geography, geology, biology, history, archaeology and mapping, all are grist to his mill. In addition, he is a distinguished explorer in his own right, and only last summer added to his long record of Saharan exploration yet another long journey by camel to the north-west of Timbuktu. Professor Monod has

been described with truth as "the outstanding Saharan traveller and geographer of today." I ask him to accept here at my hands our Patron's Medal, the award of which has the approval of Her Majesty The Queen.

Professor THÉODORE MONOD: My Lord President, please accept my most hearty thanks for the great honour extended to me by the Royal Geographical Society. Nothing could have surprised me more than to see a body of such repute, world-famous in its field, honouring me with so highly esteemed a distinction. To see one's local and regional work recognized in such a way is indeed both a great personal satisfaction and a call to further and, I hope, better research. I am very grateful indeed for a distinction of which I must feel, as a foreigner, peculiarly proud.

The PRESIDENT: The *Founder's Medal*, the award of which has also been approved by Her Majesty The Queen, is awarded to our Australian Fellow Mr. Phillip Law, for his outstanding contributions to Antarctic research and exploration. Mr. Law has been director of the Antarctic Division of the Department of External Affairs since 1949 and has since that date been the leader of successive annual expeditions to the sub-Antarctic and the Antarctic, leading to the establishment of the first permanent Australian base on the Antarctic mainland. He has been not only the leader, but in many ways the organizer and the inspiration, of these annual Australian National Antarctic Research Expeditions. Their work under his leadership has placed Australia in the forefront of the nations engaged today in Antarctic exploration and research. Mr. Law cannot himself be here, but he has provided a good proxy. For we have here today one of the most distinguished of living Australians, Lord Casey, whom we all warmly welcome.

LORD CASEY: It is a great honour to receive on behalf of Phillip Law this very distinguished Founder's Medal of this Society. And Phillip Law has asked me to say to you, Sir, how very greatly he welcomes this unique honour. With appropriate modesty, he tells me that he regards this honour as being shared with the many hundreds of Australians who have wintered in the Antarctic in the Australian sector over recent years. As Australian Minister for External Affairs for a number of years, I was Phillip Law's Minister until quite recently, and I am in a good position to say that I regard this medal as a most appropriate honour for a man of Phillip Law's calibre. He knows the Antarctic, at least the Australian sector (and it is a very large one), quite intimately, both on the mainland and in its very dangerous sea approaches. He is a man of great initiative and judgment and also of very high moral and physical courage. This is not the time to say anything about our Australian Antarctic endeavour; I only wish just to say here that this medal is very welcome and will spur us all on in Australia to further efforts in the Antarctic.

The PRESIDENT: The *Victoria Medal*, which is awarded from time to time by the Council of the Society, is this year a twofold award. Dr. Armando Cortesão, on whom I shall first call, receives the Victoria Medal for his studies in the history of Portuguese cartography. Dr. Cortesão has established himself as the leading Portuguese scholar in the history of cartography and has achieved international distinction in this field. In addition to numerous very important works on Portuguese cartography of the fifteenth and sixteenth centuries, he has just completed a further and monumental work published this year in celebration of the quincentenary of the death of Henry the Navigator. No year could be more appropriate in which to honour so distinguished a Portuguese scholar. I have much pleasure in presenting to Dr. Cortesão the Victoria Medal.

Dr. ARMANDO CORTESÃO: As a Portuguese historian of cartography I have two reasons to be grateful for the great distinction conferred upon me by the Council of the Royal Geographical Society. I am aware that this Victoria Medal belongs, first and foremost, to my country which, on the occasion of the quincentenary of the death of Henry the Navigator, has had the vision and courage to publish the five volumes of 'Portugaliae Monumenta Cartographica,' chiefly for presentation to cultural institutions all over the world. Only after this acknowledgement can I claim my share in this award, for the conception and planning of the great work and my part in its execution. For me, the publication of 'Portugaliae Monumenta Cartographica' has been a dream

of more than thirty years come true, and I cannot say with Longfellow that "Life is but an empty dream!" I wish that all scholars were as lucky.

In the second place, I am very happy that so venerable an institution as the Royal Geographical Society has again recognized the importance that is due to the history of cartography. No more explicit documentation exists than the early maps which graphically record the successive advances of geographical knowledge; and in the history of Portuguese cartography is reflected the history of the discovery of most of the world.

I took pleasure in writing all my texts for 'Portugaliae Monumenta Cartographica' directly in English, and my English-speaking readers will be relieved to find that my foreign accent is less pronounced when I write; particularly—let me gladly admit—as my original texts were read by my scholarly and painstaking friend Mr. R. A. Skelton, without whose devoted cooperation this monumental work could not have been what it is.

Let me recall also an Honorary Secretary of this Society, Richard Henry Major. He was (like Mr. Skelton) an officer of the British Museum and the Hakluyt Society, and in his life of Prince Henry—the first and still the best English biography—he coined the epithet "The Navigator" ever since attached to the Prince.

A final word of thanks to those who have thought it opportune to commemorate one of the greatest men, not only in the history of my country but also in the history of mankind—a prince who, as the son of a remarkable Portuguese king and a remarkable English princess, exemplifies the ties between our two nations.

The PRESIDENT: The second of the two *Victoria Medals* awarded this year goes, I am very happy to say, to our own Vice-President, Professor J. A. Steers of Cambridge University. Professor Steers is the leading exponent of the study of the coastal morphology of this country, and he has made important contributions to the study of coastal conditions in other lands. His own important researches in this field, and the valuable contributions which, under his guidance and inspiration, his department at Cambridge has made, have an international reputation. I have much pleasure in awarding him the Victoria Medal.

Professor J. A. STEERS: I think I have now been a member of this Society for forty-two years, and during that time I have received nothing but help and kindness from it; help in my work abroad and also in this country—not least in regard to publication. But in accepting this medal, which I prize most highly, I would like to mention two people, both of them my predecessors. First of all, Philip Lake to whom I owe a great deal: he was head of the department of geography when I was a student; and also my immediate predecessor, Professor Debenham, who was also a recipient of this medal.

The PRESIDENT: I now turn to the Awards, the first of which, the *Murchison Grant*, goes to Professor J. Wreford Watson of Edinburgh University for his contribution to the development of geography in Canada. I had hoped that Professor Watson might be present in person to receive this award for his outstanding services to Canadian geography. However, he is still in Canada, and instead of having him here it is a great pleasure that Mr. Moir, Honorary Secretary of our sister society the Royal Scottish Geographical Society, is here to receive it on his behalf.

Mr. MOIR: First may I express my own pleasure in being here to act as proxy on behalf of Professor Wreford Watson. He asks me to convey to you, Mr. President, his apology for not being present, to his very great regret. As you have said, he is still finding duties to keep him in Canada for a good part of the year. He therefore asks me to convey to you and to the Council of the Society his very deep appreciation of this award, particularly for its recognition of his work in Canada.

The PRESIDENT: The *Cuthbert Peek Grant* for 1960 is awarded to Mr. G. F. Reid of the Directorate of Overseas Surveys, for important contributions to Antarctic surveying. Mr. Reid's work has been in the Falkland Islands and in their Antarctic Dependencies. In the latter area, in 1958, Mr. Reid trained and led a tellurometer party which was the first to use this remarkable instrument in the Antarctic. The result was to establish accurately the connection between the South Shetlands and the main Graham Land peninsula; a connection of vital importance to navigation.

Mr. G. F. REID: I feel very highly honoured at receiving this award. I consider it also an honour for the other members of the expedition, who were the Captain and the crew of H.M.S. *Protector* and the five F.I.D.S. surveyors, who were seconded for the duration of the survey. My Lord President, please receive my thanks.

The PRESIDENT: The *Back Grant* has been awarded to Mr. A. T. Grove of the department of geography of Cambridge University for his geomorphological studies in northern Africa. Geographical studies are basic to all schemes of planning and development, and nowhere is this more so than in Africa where Mr. Grove has, with very important results, been so successfully applying geographical techniques.

Mr. A. T. GROVE: It gives me very great pleasure to have this award from the Society. I feel that what I have done is quite minute, particularly in comparison with the work of Professor Monod in North Africa, but that the award recognizes the work of other geographers in that part of the world. I am particularly pleased to have this award today in company of my own professor, Professor Steers, who has always been a source of great encouragement to me.

The PRESIDENT: The recipient of this year's *Gill Memorial* is Dr. Joyce Lambert, of the University of Southampton, for her research into the origin of the Norfolk Broads. The details of Dr. Lambert's researches, and those of her collaborators, have recently been published in 'The making of the Broads,' which forms the third of the Society's series of Research Memoirs. The result of her work can be briefly stated: it is no less than the discovery that the Broads were of human origin. That was a very surprising and a very substantial discovery and for her leading part in it Dr. Lambert receives the Gill Memorial.

Dr. Joyce LAMBERT: As a botanist, who has strayed by accident into the geographical field, I do feel particularly honoured at the receipt of the Gill Memorial. I might say, incidentally, that having strayed into the geographical field, and thrown a small spanner into the geographical works, I am now engaged in retreating as quickly as I can back into the botanical field. Further I might say that this is a tribute that I do not take to myself alone; I should like to take it also to my many colleagues, who have collaborated with me in the theories of the origin of the Broads. Mr. J. N. Jennings, who himself received the Back Grant some years ago and carried out the pioneer work on the morphology of the region; Mr. Clifford Smith of Cambridge, who gave body, as it were, to the theory once it had been formulated, and clothed its bare bones with the flesh of the human and documentary side; Mr. Charles Green, an archaeologist, who not only produced the archaeological evidence in support of the theory, but also gave a wider geographical setting; and to Mr. John Hutchinson who, as a Civil Engineer, prevented us all from becoming too academic, when we were inclined to do so, and kept us to the practicality of the whole project. To these colleagues I would like to offer my thanks at this time, as well as to the Royal Geographical Society for the support which they have given me in publication of the work and also for the award this afternoon.

The PRESIDENT: Finally I come to the *Mrs. Patrick Ness Award*, the most recent to be founded. It goes this year to Dr. R. J. Adie, for his many important contributions to Antarctic geology. Dr. Adie is in charge of the sub-department for Antarctic geology which has been set up at Birmingham University by the Scientific Bureau of the Falkland Islands Dependencies. It has been most justifiably said of Dr. Adie that his influence on successive generations of Antarctic geologists has been outstanding.

Dr. R. J. ADIE: It is a very great pleasure to me to receive this award today, especially in the presence of Sir Miles Clifford, because I think it was Sir Miles who gave me some of the greatest encouragement I have had in the Antarctic. When I first became interested in Antarctic geology about fifteen years ago, I fell very much under the influence of some of the more prominent members of the Society, and especially people like Sir Vivian Fuchs, with whom I was able to work in southern Graham Land; in Alexander Land for some two years I also fell under the influence of Sir James Wordie and more latterly of Sir Raymond Priestley, both of whom have been extremely interested in the work we are doing. As I said earlier, for fifteen years we have been working away at the geology of Graham Land and at long last, my Lord President, we

are beginning to see the light. The picture that is emerging of the geological history of Graham Land is most fascinating, and within the next two or three years, I am sure, we will be able to tie it up very much more clearly with what has been worked out in other parts of the Antarctic. I thank you very much for the Mrs. Patrick Ness Award.

The PRESIDENT then drew attention to the Annual Report which had been previously circulated, and called on the acting Hon. Treasurer, Mr. G. P. PIRIE-GORDON, to speak about the Balance Sheet and Accounts.

At the conclusion of Mr. Pirie-Gordon's remarks the Annual Report and Balance Sheet were adopted. Colonel K. W. Merrylees and Mr. G. N. Martin acted as scrutineers of the Ballot for election to the Council, and it was announced at the close of the meeting that all the candidates proposed for the Council and as Officers for the ensuing year had been unanimously elected.

THE ANNUAL DINNER

The Annual Dinner of the Society was held at the Hyde Park Hotel on 13 June 1960. Lord Nathan, President of the Society, and Lady Nathan received the company of 279. Field-Marshal Viscount Montgomery of Alamein was the principal guest and proposed the Toast of the Society. Other guests were the Polish Ambassador, the Peruvian Ambassador and Señora Schreiber, the High Commissioner for Australia and Lady Harrison, the Portuguese Ambassador and Senhora Pinto, Lord Casey, Sir Charles Wheeler, President of the Royal Academy, and Lady Wheeler, Professor Théodore Monod, Captain M. L. Hardie, R.N., and Mrs. Hardie, Dr. Armando Cortesão (Victoria Medallist), the Earl of Inchcape, Sir Richard Powell, Sir Bernard and Lady Waley-Cohen, Mr. and Mrs. Isaac Wolfson, the Hon. Roger and Mrs. Nathan, and Mr. Oswald P. Milne, Chairman of the Royal Society of Arts, and Mrs. Milne.

After Grace by the Reverend Gregory Hopper, the President read the telegrams exchanged between the Society and Her Majesty The Queen:—

"As President Royal Geographical Society and on behalf of Council Fellows and Members assembled today for Anniversary Meeting presentation Royal Medals and Annual Dinner I beg leave to offer to Your Majesty our Patron loyal greeting and respectful affection."

Her Majesty replied as follows:—

"Please convey to the Council Fellows and Members of the Royal Geographical Society assembled today for their Anniversary Meeting presentation Royal Medals and Annual Dinner my sincere thanks for their kind and loyal message of greetings which as your Patron I greatly appreciate."

After dinner the Loyal Toasts were proposed by the President and duly honoured.

The Toast of the Society was proposed in a speech by Viscount Montgomery of Alamein and replied to by the President in the following speech.

The PRESIDENT: Field-Marshal, Your Excellencies, My Lords, Ladies and Gentlemen.

First of all, Field-Marshal, I must thank you for the very kind remarks you have made about the Society and about myself. We are indeed fortunate in having you here as our Guest of Honour tonight. Unlike a good many of your predecessors, you at least in the course of your distinguished career have confessed to some concern with geography. There can indeed be few commanders who are so well versed in geographical matters. You, one of the greatest commanders of modern times, have shown better than any in the course of your continental campaigns just how geography should be used in the cause of victory. And your enthralling account tonight of your most recent travels surely wins you the title of Honorary Geographer!

Of course, in another respect you are very different from some geographers I have known. You not only say what you think; people can understand what you say! You yourself have claimed as much, and none who have heard your forthright remarks on a variety of topics, military and non-military, could possibly deny it. I wish the same could be said of some geographers, or for that matter of some other social scientists.

Why should jargon—verbose, obscure—be regarded so often nowadays as essential to this kind of scientific writing? Reading it I am reminded of the excellent editorial advice of Alexander Pope:

> "Prune the luxuriant, the uncouth refine,
> But show no mercy to the empty line."

Much as the soldier, the commander, has in common with the geographer, he has even more in common with the explorer. And with the explorer, of all ages and of all nationalities, we in the Royal Geographical Society have much to do. You, Field-Marshal, with your customary clarity, have defined the qualities required of the commander—inspiration and initiative and, no less important, an infinite capacity for taking pains. These are just the qualities required of the modern explorer. They are great qualities; they are qualities required by all who aspire to leadership in every walk of life. Some are inborn, but some can be developed. And looking at the distinguished careers of many of those who explored in their youth, I am convinced that there is no way in which they can be better developed than by experience of exploration; than by the promotion of exploration among the young.

We of the Royal Geographical Society, who have been at the heart and centre of British exploration for 130 years, give a great deal of attention to the promotion of exploration among the youth of this country. Indeed, I am convinced that there is no way in which we of this Society can better serve the national interest at the present time. This year we have, either directly or through our partnership in the Mount Everest Foundation, supported thirty-eight expeditions of young men (and of young women) to many remote parts of the world. These young people do not get our support merely for the asking. Plans are carefully vetted. Leaders and others are all personally interviewed. And the fact that this year many projects failed to obtain our support is a warning that foolhardy or ill-prepared expeditions, mere "stunts" or mere holiday jaunts, get no sympathy from our expert selection committee. We welcome the initiative of these young people. But even a small expedition these days requires proper planning and preparation. And planning and preparation demand hard work and hard thought.

We do not try and organize these expeditions. We help with advice and support, but we leave it to the young to organize themselves; this indeed is one of the most important lessons these expeditions teach. What we do insist upon is that they should all have some scientific or academic objective. There is a very great value in this from a number of points of view. We do not expect any startling scientific results, but some very solid work is often done and these expeditions give invaluable training in field techniques. I also value very highly the combination of scientist and non-scientist in these expeditions. It gives the humanist the chance to share in the excitement of scientific work in the field and all this helps towards a broader understanding of scientific issues. Anything that helps to bridge the gap between the young humanist and the young scientist deserves every encouragement today.

Our support of these youthful expeditions, indeed of all expeditions, has of course had to be strictly limited. Indeed, as I said in my Presidential Address last year, I have personally greatly regretted that we have been able to accede to so small a proportion of the deserving requests which reach us. I have not only been anxious to increase the size of our grants to bring them more into line with modern costs, but I have been anxious to throw our net wider, in support of expeditions of every kind which have some geographical slant. I do not mean by that only young expeditions, greatly as we favour these. I mean also the more mature expeditions working in the less favoured fields. Nor should our assistance be confined only to those from this country. We have no less a duty to encourage initiative and adventure and the pursuit of knowledge among those from other parts of the Commonwealth, and I have particularly the young African universities in mind. We should also, I am sure, widen our horizon beyond the universities and include the young men and young women from industry and commerce as well. They would gain much by sharing in such adventurous and scientific enterprises in foreign lands.

In the past, lack of means has been the principal obstacle. But today, on the very appropriate occasion of our anniversary dinner, I have a very special announcement to make to you which, I think, will throw a much more encouraging light on the picture. My news is this: the Wolfson Foundation has seen fit to make a most generous gift to the Society—a gift of £10,000, to be spread over four years, for the support of exploration. I take this opportunity to express to Mr. Wolfson, who is dining with us tonight, and to the Trustees of his Foundation—of which I may add parenthetically that I have the privilege of being Chairman—the very real gratitude of the Council, Fellows, and Members of the Royal Geographical Society. They can, I am confident, be certain that this subvention will be spent in ways which will bring credit to the Wolfson Foundation, to the Society, to this country and to the whole Commonwealth.

While I am looking forward into the future, I should like to mention another possible development, this time on the research, not the exploration, side of our Society. Four years ago, my predecessor, Sir James Marshall-Cornwall, suggested that the time had come for the establishment of a geographical research institute in the Society. A few weeks later a leading article appeared in that admirable scientific periodical, *Nature*, strongly supporting this idea. The idea itself was not new. Many years ago, the greatest of all British geographers, the late Sir Halford Mackinder, proposed that the Society and the University of London should jointly establish just such an institute, and plans were printed and published. But, for one reason or another, nothing was done. This I think—as the writer in *Nature* also thought—was a very great pity. We have land for building; a rare possession in London these days. We have an admirable Hall for lectures and seminars. We have a Map Collection and Library unrivalled among private institutions in Europe, perhaps in the world. Indeed, with our research lectures, our research publications and our Research Committee, representing many university departments, we are already a focus for advanced geographical research.

As the article in *Nature* pointed out, the Society on its side has shown itself willing to reconsider the scheme. It is up to the university geographers, and in particular to those of London University, to respond. I do not think there is any doubt about the need for such an institute. Geography, a bridging and coordinating subject with many diverse branches, requires more than most subjects a central institute of this kind; and nowhere more so than in London where the geographical departments of the university are so widely scattered. If the University of London thought fit to take some initiative in the matter, having in mind all the facilities we have to offer, I personally would welcome it. Ever since our foundation, we have been closely linked with the development of geography in our universities. Our first Secretary, Captain Alexander Maconochie, in the 1830's held the first chair of geography at any British University, at the new University College of London. Half a century later, in the eighties, we joined with Oxford and Cambridge in founding geographical posts and departments at both these universities. Indeed, between 1887 and 1924 we contributed more than £20,000—a very large sum in those days—to establish geography as an enduring part of university education in Britain. The foundation of an institute of geographical research on our premises would set a seal upon all these earlier efforts and would provide a focus for research workers not only from this country but from the Commonwealth—indeed from all parts of the world.

These two objectives, the expansion of exploration—now to be greatly helped forward by the Wolfson Foundation's grant—and the advancement of research, are those which will be uppermost in my mind in this, my third—and last—year of office as President. It is with such thoughts for our future, Field-Marshal, that I respond with very great pleasure to your toast of "The Royal Geographical Society."

The Toast of "Medallists Guests" was proposed in a speech by Sir Edmund Hillary. Lord Casey and Professor Théodore Monod replied on behalf of the Medallists, and Sir Charles Wheeler, President of the Royal Academy, on behalf of the Guests.